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GLOBAL CEMENT MAGAZINE: DEAR READERS

Wikov Industry a.s.

1918 was a breakthrough year. Czechoslovak independence from the Austro-Hungarian Empire was declared and it was the year that the Škoda works in Pilsen started producing gears and gearboxes. In December of the same year, Wichterle-Kovarik, then as two independent mechanical engineering companies with similar scopes of production, merged to create the Wikov brand, known around the world for mechanical gearboxes for the cement industry and many other gear products. 100 years later and Wikov is stronger than ever, combining the expertise of three famous Czech brands, Škoda, Wikov and ČKD. Read more about the history of the company on Page 10 of this issue of *Global Cement Magazine*.

Ad Index

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Dear readers,

Welcome to the October 2018 issue of *Global Cement Magazine* - the world's most widely-read cement magazine! The global cement sector is truly huge, but it produces an ingredient that contributes just 15% of the weight of a different final product: Concrete. Usually we steer clear of covering concrete in these pages but this issue makes an exception to help orientate cement within the wider construction industry. For starters, the concrete sector is six times larger than cement and there are a lot of companies involved. Many of these will be familiar to readers, but many also won't be. In an attempt to piece together how the sectors overlap, we have compiled what we believe to be the first ever listing of the Top 25 global concrete producers - Turn to Page 8. The '*Top 25 Global Concrete Producers' report* will be released in due course.

Cement is also the most *expensive* component in concrete. This means that, if cement has been stored for a significant period or has become sticky on site, it loses some of its ability to bind, potentially raising building costs (due to using more cement) or unsafe structures due to weaker concrete. Relatively simple and inexpensive cement activation processes can lead to improved binding characteristics, reducing or eliminating these risks. Turn to Page 19 to find out more.

Elsewhere in this issue we have a look at whether airline-style variable pricing is a viable way for cement producers to approach cement distribution logistics (Page 16), how emission peaks can be avoided by tackling variation in the quarry (Page 12), a historical look at the gear manufacturer Wikov Group in its 100th year (Page 10 and above) and our review of the cement industries of 15 west African nations (Page 46). A *lot* has changed since we last reviewed the region in 2013.

There are also reports from the recent *FICEM Technical Congress* in Panama City, Panama (Page 36) and the *RWM Exhibition* on recycling and waste management in Birmingham, UK (Page 30), as well as all the latest cement-related news from around the world.

We hope that you enjoy this issue of Global Cement Magazine!

Hedward

Peter Edwards Editor





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GLOBAL CEMENT MAGAZINE: CONTENTS

Ad Index

Features

8 Top 25 Global Concrete Producers

The global cement industry is huge, but it produces an ingredient that makes up only around 15% of the final product of an industry six times larger: the global concrete industry. Here *Global Cement* lists - for the first time ever - the world's top 25 concrete producers...

10 Wikov: A brand of renowned names

Lukas Steiner, Marketing Manager of Wikov Group, describes how three historic strands, Škoda, ČKD and Wichterle & Kovářík, grew together to form the Wikov Group, which celebrates its 100th Anniversary in 2018.

12 Emissions control starts in the quarry

Petr Bláha and Arnaud Pujol of abpb consulting explain how one cement plant reduced its CO emissions by careful analysis and use of its quarry.

16 Dynamic pricing: An option for cement logistics?

How can airline-style dynamic prices be applied in the cement sector?

19 Final pulverisation and activation of cement using vortex layer devices

In many cases the binding properties of cement are not fully utilised, causing additional expenses and reducing construction material quality. Cement pulverisation and activation offers a solution...

22 Products and contracts

San Miguel contract for Loesche; Aggregate Industries signs Siemens deal; Quinn launches new range.

Europe

24 News - GCCA gains six new members; German cement consumption up 4.8% in 2017; Two upgrades in UK.

30 Picture Review: RWM 2018

A pictorial review of the RWM Exhibition on recycling and waste management, which took place in Birmingham, UK on 12-13 September 2018.

GLOBAL CEMENT MAGAZINE: CONTENTS

Americas

32 News - Buzzi buys partner out of BCPAR; Sales rise rapidly in Argentina; Colombian production on the wane.

36 Review: FICEM 2018

David Perilli looks back at the FICEM Technical Congress 2018, which took place in Panama City, Panama on 3-5 September 2018.

Asia

38 News - Modest sales rise for Boral; Dalmia Cement to go CO₂ negative; Vietnam exports 20Mt of cement in eight months.

Middle East & Africa

43 News - CIMAF launches Chad grinding plant; Helwan agrees to sell white cement plant; ASEC to leave Zahana plant.

46 Cement in West Africa

An overview of the cement sectors of Benin, Burkina Faso, The Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone and Togo.

Regulars & Comment

63 Global Cement prices

Cement prices from around the world. Subscribers get additional information.



65 The Last Word - The rise of Al...

66 Advertiser Index & Forthcoming issue features

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GLOBAL CEMENT: TOP 25 CONCRETE PRODUCERS

Contents Subscribe Ad Index Robert McCaffrey, Global Cement Magazine

Top 25 Global Concrete Producers

The global cement industry is huge, but it produces an ingredient that makes up only around 15% of the final product of another industry that is six times larger: the global concrete industry. Here *Global Cement Magazine* lists - for the first time ever - the world's top 25 concrete producers. Many are major producers of cement, but not all of them. Further details will be available in the forthcoming '*Top 25 Global Concrete Producers report.*'

The grey or white powder known as cement is an important ingredient when producing concrete (also known as ready-mixed concrete, readymix, RMC and by other names). Cement is the main 'active' ingredient in a concrete mix, which, when combined with water recrystallises into a hard matrix which solidifies around the other constituents, binding them together. Cement makes up around 15-20% of the weight of the ingredients, which also include water, sand and aggregate. Other ingredients may include special chemicals that delay or accelerate setting, that impart higher early strength or reduced heat of hydration, or which increase the flowability of the unset concrete. Other ingredients may include inert fillers such as ground limestone, or cementitiously-active alternative materials such as ground-granulated blast

Rank	Company	Country HQ	Mm ³ (2017)	% of Top 25	% of world*
1	CNBM	China	82.22	21.2	2.21
2	Cemex	Mexico	52	13.4	1.40
3	LafargeHolcim	Switzerland	50.6	13.0	1.36
4	HeidelbergCement	Germany	47.2	12.2	1.27
5	CRH (inc. Oldcastle)	Ireland	27	7.0	0.73
6	BBMG Corporation (with Jidong)	China	14.73	3.8	0.40
7	UltraTech Cement	India	14	3.6	0.38
8	Buzzi Unicem	Italy	12.3	3.2	0.33
9	Cementos Argos	Colombia	10.6	2.7	0.29
10	Vicat	France	9.7	2.5	0.26
11	Votorantim	Brazil	7.8	2.0	0.21
12	China Resources Cement	China	7.26	1.9	0.20
13	US Concrete Inc	USA	6.88	1.8	0.19
14	Martin Marietta Materials (including TXI)	USA	6.54	1.7	0.18
15	TITAN Group	Greece	5.6	1.4	0.15
16	Cementir Holding	Italy	5.1	1.3	0.14
17	Thomas Concrete Group	Sweden	4.8	1.2	0.13
18	Summit Materials	USA	3.58	0.9	0.10
19	Cimsa	Turkey	3.44	0.9	0.09
20	Vulcan	USA	2.9	0.7	0.08
21	ACC Limited	India	2.88	0.7	0.08
22	MDU Resources Group	USA	2.71	0.7	0.07
23	Intercement (Owner Camargo Corrêa)	Brazil	2.7	0.7	0.07
24	Limak Concrete	Turkey	2.7	0.7	0.07
25	GCC Grupo Cementos de Chihuahua	Mexico	2.65	0.7	0.07
			387.9Mm ³	100.0%	10.44%

Right - Table 1: Top 25 global concrete producers, by volume of concrete sold in 2017. Source: *Global Cement* research and company reports.

Notes: A number of companies are known to produce concrete at large scale, but the amount is not separately reported in their annual company reports. Several companies give their production capacity in their websites and annual reports, but do not reveal their actual production. All companies that could potentially have been included on this list were contacted to request information, including two whose production capacity was above 10Mm³/yr. Companies that failed to provide information are not included.

Companies that wish to be included in future global rankings should send details of their most recent actual annual readymixed concrete production (in Mm³/yr) to the author, at rob@propubs.com furnace slag, silica fume, rice husk ash or flyash. Each cubic metre of concrete weighs around 2400kg, and includes 350kg of cement (140kg/t), 700kg of sand (280kg/t), 1200kg of aggregate (480kg/t) and 150kg of water (60kg/t).

Industry trends and dynamics

Producers of cement have progressively become more involved in the concrete industry over the decades, through a process of vertical integration, whereby the cement companies progressively buy-out their customers, or - less commonly - establish and expand their own new concrete businesses. Through this vertical integration, (which may include the quarrying and sale of sand and aggregates used in the concrete mix), the cement company can capture the greatest proportion of the profits that are available through the production of concrete, strongly driving growth, while at the same time giving it greater pricing power over its final product - ready-mixed concrete. For this reason, the vertical integration of the cementaggregates-concrete industry has come under the investigation of competition authorities around the world. However, the global concrete industry is even more fractured - on a global scale - than the cement industry, with few companies dominating nationally. As seen in Table 1, the world's largest producer of ready-mixed concrete controls just over 2% of the global market (compared to Sinoma/CNBM's nearly 12% of the global cement industry). Due to the relatively high density and low monetary value of the product, the over-riding characteristic of the global concrete industry is that it is intensely local.

The fractured and localised nature of the ready-mixed concrete industry means that cement producers have a 'target-rich environment' when it comes to potential acquisition targets. Buyouts and takeovers of RMC companies by cement producers are announced on a regular basis, and this is a trend that will continue as global urbanisation - and RMC profitability - increases.

Data limitations

The data presented in Table 1 is largely taken from company reports for the 2017 calendar or financial year. Some companies include the actual volumes of ready-mixed concrete sold in a prominent position in their reports as a key group figure (for example LafargeHolcim places the figure on page 3 of its Annual Report). Other companies bury the figure deep within their reports, or give only financial data for concrete sales - the volume of which can then be calculated by using average selling prices given elsewhere in the report (or by using the selling prices of other operators in the same markets). Some companies include volumes sold by franchisees, and many others name only their production capacity, rather than their actual production (in which case they have not been included). Calculations show that in some markets, notably in China, concrete production plants are only working at 20% of capacity.

Other major companies indicate that they have a ready-mixed concrete division or sector, but do not split out ready-mixed concrete from other business lines. Still other companies are privately-held, and do not divulge figures of any kind. These companies have been excluded from this list of the Top 25 global ready-mixed concrete producers.

However, to our knowledge, this is the first attempt to list the world's largest ready-mixed concrete producers.



CEMEX HEIDELBERGCEMENT 52.0Mm 13.4% 网络小鼠 47.2Mm³ 12.29 14.7Mm³ 3.8% UltraTech Top 25 27.0Mm³ 14.0Mm³ 82.2Mm³ 388Mm³ 3.6% 21.2% **1997 (19** 12.3Mm³ 10.6Mm³ 3.2% 2.7% 9.7Mm³ 2 5%

Below left: Visualisation of the Top 25 global concrete producers, by volume of concrete sold in 2017. Source: Global Cement research and company reports.

> Global cement production estimate for 2017 is 4100Mt [https://www.statista.com/ statistics/219343/cementproduction-worldwide/].

*To estimate the the proportion of global cement production that is used in ready-mixed concrete. the tonnage of cement used in the UK in 2016 (10.87Mt) was compared to the amount of ready-mixed concrete produced in 2016 (24.6Mm³): 10.87Mt of cement could (at 15% cement content) produce 72.46Mm³ of ready-mixed concrete, but in fact only 34% of this figure was produced. If the calculated 34% factor (proportion of total cement production used in readymixed concrete production) from the UK is applicable worldwide, this implies (with a 15% w/w content of cement in concrete. and a weight of concrete of 2.5t/ m³) a 2017 global production of ready-mixed concrete of 9293Mt. or 3717Mm3 (3.7km3).

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Lukas Steiner, Wikov Group

Wikov: A brand of renowned names

Wikov engineers and manufactures gearboxes for 13 different industries, including the global cement sector, at two key factories in the Czech Republic. In 2018 the company is owned by Martin Wichterle, the great grandson of Karel Wichterle, the co-owner and founder of the Wikov brand. Three parallel brands, Škoda, ČKD and Wichterle & Kovářík, grew together to form Wikov as we know it today. Here Lukas Steiner, Marketing Manager of Wikov Group, looks separately at the history of the three strands...

History of Škoda

The history of Škoda, one of the largest European industrial conglomerates of the 20th Century, dates back to 1869 when it was founded by Czech engineer Emil Škoda. He took over a small engineering plant from Count Waldstein after working for three years at its 100-employee Pilsen production plant. Škoda's Pilsen plant was also the predecessor of the modern Škoda car manufacturer.

Škoda soon expanded the firm, and, in the 1880s, founded what was then a very modern steelworks capable of delivering castings weighing dozens of tons. Steel castings and, later, forgings for large passenger liners and warships went on to rank alongside the sugar mills as the top export sectors of the plant.

In 1899, the ever-expanding business was transformed into a joint-stock company, and, before the First World War, Škoda Works became the largest arms manufacturer in Austria-Hungary. It was a navy and army contractor, mainly supplying heavy guns and ammunition.

Exports included castings, such as parts of the piping for the Niagara Falls power plant and the Suez Canal sluices, as well as machinery for sugar mills in Turkey, breweries throughout Europe, and guns for the Far East and South America. The First World War brought a drop in the output of civilian products. Huge sums were invested to expand its weapons' capacities. By this time, Škoda Works already held majorities in a number of companies in Czechoslovakia and abroad that were not involved in arms manufacture. In 1917, the company had 35,000 employees in Pilsen alone.

Following the emergence of Czechoslovakia in 1918, in the complex economic conditions of postwar Europe the company was transformed from what was exclusively an arms manufacturer into a multi-sector concern. It was the year that Škoda Gear was founded to produce large gears and mechanical gearboxes.

In 1923, the company's world-famous registered trademark - the winged arrow in a circle - was entered

at the Companies' Register. In 1924, Škoda Works acquired the Laurin-Klement car manufacturer, later known as Škoda Auto. The companies were separated after 1945, when the entire Czechoslovakian economy came under government control.

The cement history of Škoda Gear is tied to Přerovské strojírny, nowadays PSP Engineering, a company that supplies technological equipment for the treatment of minerals and production of building materials since the 1950s. Through the decades of cooperation the gearboxes with the winged arrow logo found their place in many cement plants around the world. Even the post-communist era did not leave its mark on the cooperation with PSP Engineering. Deliveries of gearboxes through this sales channel were able to continue with certain fluctuations.

A recent milestone for Wikov Gear was an order for the largest drive in its 100 year history. It was a complete horizontal ball mill drive consisting of two Side Drive gearboxes and a girth gear. The complete drive weighed 120t and it was 8m long, 5m high and over 2.5m wide.



Right: A 50t cast-steel piping branch for the hydroelectric power plant at Niagara Falls before it left the Škoda factory in 1905.

GLOBAL CEMENT: GEARS





Wikov has since become a globally-recognised gearbox brand in the global cement sector. The people behind the success don't want to just 'live off' the history of the company but also adopt the creative mindset of the founders into its corporate culture. Wikov invests in progressive machinery to be at the cutting edge of its industry and thus deliver long-lasting products to its customers.

Far left: Making piston rods for marine diesel engines at ČKD Hronov in 1963.

Left: Part of a 120t ball mill drive that was supplied by Wikov Gear to Spassk Cement in Russia.

History of Wikov

Wikov was established on 22 December 1918 by the merger of two companies – Wichterle and Kovářík. The merger of these two big firms, right after the First World War, made Wikov the largest manufacturer of agricultural machinery in the newly formed Czechoslovakia. The factory occupied an area of 250,000m² and employed 2000 workers and 150 clerks. The range of products offered by Wikov was extremely wide. Apart from agricultural machinery, it also made diesel, petrol and gas engines and generators to drive mills and other equipment.

In 1922, when the owners of Wikov visited an exhibition in Vienna and returned home with a car by Italian Ansaldo, an automobile became a new product line at Wikov. Although their production represented less than 10% of the total volume of production, most of the cars were originals tailored to the needs of the customer. The world renowned shoe maker Tomáš Baťa had a sleeping car for his journeys from Zlín to Prague manufactured by Wikov. In 1929, the company began to produce agricultural tractors. During the Second World War the production of agricultural machinery and equipment was limited and the company was forced to manufacture for the German war effort.

Wikov suffered a similar fate to other successful companies in post war Czechoslovakia, when it was nationalised in March 1946. It was renamed Agrozet, k.p. and later Agrostroj Prostějov, a state owned company. The Wikov brand disappeared for 58 years.

Modern Wikov history

The brand was revived in 2004 by Martin Wichterle, when newly acquired companies ČKD Hronov and Škoda Gear in Pilsen were renamed Wikov MGI and Wikov Gear. The acquisition started a new era for both factories, which would not otherwise have survived much longer in the tough competitive conditions of the post communist-era. From Martin Wichterle they received much-needed investment and a new approach.

History of ČKD

KD was one of the major Czechoslovakian engineering enterprises that emerged from the development of Austro-Hungarian industry in the second half of the 19th Century. Today, several smaller companies operate with the name ČKD in the Czech Republic.

However, the history of ČKD, one of the most important Czech engineering brands, goes deep into the past. It was founded by businessman and scientist Emil Kolben, who along with Nikola Tesla and Thomas Edison, was one of the pioneers of the worldwide development of electrical engineering. At its height, ČKD had 12,000 employees and a very wide product line emphasised by its famous slogan, *'We make everything, from pin to locomotive.'*

ČKD Hronov's foundations were laid in 1884 by the entrepreneur Pazler. With 85 employees, the company began to produce bending and straightening machines, canning and tinsmith machines. Its first export order came in 1921. Following the communist nationalisation after the Second World War, the factory was merged into ČKD Group in 1965. The plant was reoriented to produce parts for heavy and medium-sized diesel engines. With the downturn in the diesel engine market in the 1980s, it was necessary to choose a new major product for the company. Marine and industrial gearboxes were selected.

ČKD Hronov was transformed into Wikov MGI through an acquisition by Martin Wichterle in 2004. The past decade has been dominated by its line of gearboxes for rail vehicles - Every third tram from the recent worldwide order book is fitted with a Wikov gearbox.



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Dr Petr Bláha & Arnaud Pujol, apbp consulting GmbH

Emissions control starts in the quarry

Emissions limits for cement plants are getting stronger in many world regions. Often plants resort to mitigation equipment, which is expensive to buy and to operate, in order to meet them. Most of the time, emission relevant components, such as volatile organic compounds, pyritic sulphur, mercury and others, are inherent to the raw materials used in the process. The accepted standpoint in the industry is that little can be done to control these elements coming from the quarry and thus little control can be exerted. In reality, this is far from the case. The case-study presented below shows how a detailed evaluation of the deposit, followed by block modelling and quarry planning, can not only improve the control of emissions, but also decrease them.

A cement plant was confronted with increasing and erratic CO emissions. Due to the lack of predictability, the process team could only react to the detected emissions after they had happened. In order to have some degree of control, the production department defined an internal limit, more restrictive than the legal one, so that the adjustments of the process had enough time to reverse the upward trend in the CO emissions. The plants used two process methods for controlling the emissions:

- Reduction of the kiln feed rate, which caused a production loss of 25,000t/yr of clinker in a sold-out market. This incurred losses of around Euro680,000/yr;
- Use of the kiln feed bypass system, which caused heat losses of around 60MJ/t of clinker and increased the frequency of blockages in the cyclones.

Solution

The plant management investigated the origin of the emissions to be able to predict CO peaks and anticipate potential issues ahead of time. It turned out that the quarry was the main source of CO emissions. The total organic carbon (TOC) content of the limestone mined correlated well with the levels of CO emissions.

The plant carried out a detailed deposit evaluation to determine the distribution and level of TOC in the deposit. This included an in-fill drilling campaign with 41 reverse circulation drill holes, the integration of this new data into the existing exploration database, statistical and geostatistical analyses of all data, and an update of the block model. The quarry plans were then updated, based on the updated model, integrating the control of TOC into the planning restrictions.



Right - Figure 1: TOC levels vary within the limestone quarry.

GLOBAL CEMENT: EMISSIONS



Left - Figure 2: Typical vertical profiles for TOC.

Project realisation

A horizontally layered limestone formation forms this deposit. The top of the limestone is weathered (Figure 1) and there is a thin clay layer (about 0.5m) approximately in the middle of the limestone sequence. The clay layer separates the limestone sequence into two different units with respect to TOC content: limestone A and limestone B (Figure 2). The main oxides (SiO₂, Al₂O₃, Fe₂O₃, CaO), MgO and alkalis (K₂O and Na₂O) are only marginally affected by the clay layer (Figure 3).

An in-fill drilling campaign – 41 Reverse Circulating Drill holes - was designed to investigate the area foreseen to be mined in the coming years (Figure 4, right picture), as no TOC data was available.

The model was then updated with the obtained new data (Figure 5) and TOC used as a key planning constraint: the TOC in the material mined had to be below 0.5% to keep the CO emissions below the internal limit (Figure 6).



The key to control the CO emissions was to split the single production bench into two: the top bench, from the top of the quarry to the clay, and the bottom bench, below the clay (Figure 2). Previously, with a single production bench, the quarry had no chance to control the amount of TOC getting in the process and the fluctuating CO emissions reflected this random input. With two benches, the quarry can now control the amount of TOC that is put into the raw mix, blending the materials of the top and bottom bench in adequate proportions (Figure 6).

Results

The decrease of CO emissions is evident and sustainable (Figure 7). The project brought additional benefits beside the full control of CO emissions:

- Improved reputation;
- Increased clinker production in a sold-out market;



Left - Figure 3: Relative grouped histograms for TOC and CaO.

GLOBAL CEMENT: EMISSIONS



Above and Below - Figure 4: Existing TOC data (above - yellow dots) and in-fill drilling campaign (below).



- Reduced use of the kiln feed bypass;
- Minimisation of heat losses, which were approximately 2% of thermal energy consumption;
- Decrease of the number of cyclone blockages from 14/yr to 5/yr;
- Enhanced safety in the quarry (smaller benches) and the plant (fewer declogging operations).

Conclusions

This case study demonstrates that a proper deposit investigation, adequate block modelling and quarry planning enable the prediction and control of CO emissions. The methodology can be used for the prediction and control of other types of emissions.

Anticipating changes in legislation increases the benefits of these kinds of projects. In a plant, issues with emission rarely happen overnight. However, changes in the legal limits can be sudden: be ready.

These types of project can help the plant decide on which mitigation equipment to install. The character of the distribution



Right - Figure 7: Reduction in CO emissions seen after the implementation of the new mining strategy.

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Below - Figure 6: Example of a quarry plan using TOC < 0.5% as constraint. Year 1: dark blue blocks of the lower bench and red blocks of the upper bench. Year 2: yellow blocks of the lower bench and orange blocks of the upper bench, keeping a ratio of bottom/top bench of around 3/2 allow to maintain CO emissions below the limit.

Above - Figure 5: TOC distribution in the deposit. The screenshots in this and Figure 6 were taken with a test version of AtheosGeo - a new software for visualising block models, with specialisation in optimising and scheduling cement raw mix resources, developed by cobo GmbH.



of a hazardous component in the deposit must be considered for the selection of the proper equipment, as different options (Regenerative Thermal Oxidizer (RTO), Gas Suspension Absorber (GSA) or Selective Catalytic Reduction (SCR)) have different operating parameters. The realisation of such a project can also help to optimise the operating costs of existing abatement equipment.

15

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GLOBAL CEMENT: LOGISTICS

Dirk Schlemper & Thomas Bergmans, INFORM GmbH

Dynamic pricing: An option for cement logistics?

Dynamic pricing is a strategy in which businesses set flexible prices for products and services based on current market demand. While common practice in many industries, cement producers still heavily rely on static pricing models with long-term contracts between vendors and buyers. This article will look at the technology behind digital pricing and the possible benefits for the cement industry.

don't like Mondays' may well be a 1979 hit by The Boomtown Rats, but it is also a feeling that many of us subscribe to. However, according to research, it is actually the *best* day for penny-pinching car owners to buy cheap fuel. Monday morning usually marks the start of the weekly roller coaster ride of rising and falling fuel prices. They're down one moment, up the next, and they're different depending on where you live. To the average person there is little rhyme or reason to how these prices are determined, but it has always been common practice in the industry.

Other industries like airlines, hotels, and concert organisers jumped onto the bandwagon and abandoned their fixed pricing strategies more recently. With the growth of online shopping, the arrival of the 'Uber economy,' and wide-spread use of algorithms, the concept of dynamic pricing has reached new levels. On a flight we may accept that our seat neighbour did not pay the same price for his ticket as we did. The fact that our neighbour filled up their car for less isn't a big problem either.

However, are we willing to accept this practice when buying cement? Will it be okay for construction companies that a Tuesday afternoon delivery of



grey cement is cheaper than a Friday morning delivery, since this helps cement producers to increase traffic on days of weak frequency? Should cement producers revisit their current static pricing models and prepare for a transition to more dynamic models to overcome bottlenecks at plants and to attract customers that are more flexible with their demand?

Cover versions

Dynamic pricing, real-time pricing, smart pricing, demand pricing, surge pricing, personal pricing, time-based pricing, flexible pricing, or yield management; there are many slightly different 'tunes' that cash in on a pricing strategy in which businesses set flexible prices for products and services based on current market demand. Price changes may take into account supply and demand, competitor prices and other external factors in the market. Each industry takes a slightly different approach based on its needs and the demand for a product. One goal is often to increase profit generated from a specific customer. Optimising the utilisation of logistical assets and capacities, however, is a goal that is more relevant to our industry. Or, in simple terms, increase prices when demand is higher than loading capacity (e.g. long truck queues in front of the gate) and/or use incentives to increase demand when loading capacity utilisation is low (i.e. idling loading stations). In essence, it is about breaking the old trade-off between upgrading plants to cope with peak demands and facing customer complaints for poor service.

With long-term contracts between vendors and buyers in place, the business models of many cement producers are currently not designed for digital pricing. What's more, some still do not have the right digital instruments in hand to orchestrate their supply chain and logistics processes or are at an early stage of doing so. An easy way to learn the scales of dynamic pricing can be the introduction of a time slot management system.

Right - Figure 1: Fuel stations were early adopters of dynamic pricing strategies.





Left - Figure 2: Digital instruments for dynamic pricing.

From dispatcher to ticket master

Time slot management, truck appointment system, pre-booking or ticketing system – these are different terms to describe the same concept: software that is used to allocate time slots to inbound trucks. It helps to avoid hauliers arriving randomly at the plant, adding speed and consistency to onsite handling processes.

Figure 2 shows a time slot management system embedded into a central transport planning tool. This set-up helps dispatchers to initiate a three-step process:

a) The central planning tool calculates a transport plan for the following shift (a delivery schedule for each truck);

b) The transport plan is used to create a time slot plan (a loading schedule for each truck);

c) Available time slots are published on an online platform for ex-works customers.

This allows the cement producer to integrate its own truck fleet, contract hauliers, spot market hauliers, as well as ex-works deliveries (pick-ups by the buyer or the buyer's designated haulier). While a) and b) already lead to greater on-site efficiencies and streamlined processes at the gate, weighbridges, and loading stations, step c) provides an excellent mechanism to introduce elements of dynamic pricing and to further balance the peaks and troughs of logistical asset utilisation.

For time slots that fall into peak traffic zones, a surcharge can be imposed to either cement price or transport price, or a 'congestion charge' can be levied, similar to the traffic fee in central London. For time slots that fall into low traffic zones, an incentive can be given to increase the attractiveness of these slots. This could include lower cement prices, lower transport prices, or a voucher/discount for follow-up orders that are aimed at keeping the overall revenue in balance.

The backbone of this set-up is the transport plan generated by the central transport planning tool. Standard tools are either spreadsheet based or use pre-defined business rules to drive the calculations. However, as decision-making at this stage has a crucial impact on the quality of the transport plan, state-of-the-art planning tools use algorithms and Artificial Intelligence to analyse a virtually endless number of scheduling decisions. This identifies those that are ideal for minimising costs and maximising service quality, based on the business criteria defined. On top of this, the same algorithms can be used to add further dynamics to the time slot management system.

VIP ticket

In any business, all customers should be treated fairly, but that doesn't mean they must be treated *equally*. Why should a class A customer wait behind a oneoff buyer picking up a small order, even though the class A customer arrived one hour late and missed his pre-booked time slot? Business practice often requires that some clients receive preferred service or 'VIP' status. Premium customers, one's own truck fleet, contract hauliers, or ex-works deliveries – the list of possible beneficiaries is long, as is the list of reasons why they should be allowed to jump the queue or benefit from incentives or specific product promotions derived from a dynamic pricing scheme.

To roll out the digital red carpet for your customers, algorithms can process a larger range of





Right - Table 1: Incentives can help to introduce dynamic pricing.

> variables to create a loading schedule and time slot plan that includes all applicable business rules and site constraints. Business rules may include customer/contract profitability, preferred haulier list, premium service to specific customers, targets for product volumes or specific regions, and many more (See Figure 3). Site constraints that may apply are product availability at a specific loading point, loading capacity of the loading point per product group, loading point availability, interdependencies between loading points, maximum number of trucks allowed on-premise for safety reasons, equipment compatibility between truck and loading point.

> A 'red-carpet' time slot management system with real-time capabilities will also include GPS data from the trucks and live information from the gates, weighbridges and loading stations to allow the software to review and adjust all planning decisions constantly, right up to the moment before execution. It checks which order(s) can be moved forward and updates the entire schedule accordingly.

It takes two to tango

When introducing a dynamic pricing scheme, it may be very tempting to listen to the Uber economy and immediate play or plagiarise the complete repertoire of influencing factors. However, a step-by-step approach is more advisable. Cement producers should start with a simple price differentiation approach for different weekdays and times of the day, e.g. by means of a time slot management system as described above. Customer trust is a key element in any business. The driving factors behind dynamic pricing should therefore always be explainable and transparent. Once customers are used to differentiation and fluctuating prices, cement producers can slowly expand their dynamic pricing strategy, for example by using predictive algorithms or Machine Learning tools.

As outlined in 'Born digital: A new workforce in cement logistics' (Global Cement Magazine, September 2017), millennials will continue to replace the generation of 'pen and paper' dispatchers. They will also be the one who drive demand on the customers' side. Instead of clinging to ageing strategies, adaptation is needed for cement producers to survive in a digital world.

'Great songs of indifference' was another hit by Bob Geldof, who fronted The Boomtown Rats. The 'I don't mind at all' attitude that he presents in the song could prove to be very costly for any cement producer that choses to ignore digital change. It is not a question of if, but when to learn the scales.



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Frank May, Globecore GmbH

Final pulverisation and activation of cement using vortex layer devices

Cement is the most expensive component in concrete and is the decisive factor in the quality of concrete and concrete structures. However, in many cases the binding properties of cement are not fully utilised, causing additional expenses and reducing construction material quality. Cement pulverisation and activation offers a solution...

The potential binding strength of cement can be under-used due to two main factors:

- Separate cement particles (70µm and larger) are not completely involved in the hydration of cement. On average, the amount of non-hydrated cement reaches 20-25%;
- Cement may lose up to 15% of its activity during a month in storage due to absorption of moisture from the air. This causes sticky cement.

It is possible to improve the efficiency and reduce the required amount of the binding material by increasing the fineness of grinding, optimising the granulometric size composition and changing the shape of powder particles. Activation is required for cement that has been stored and become sticky - it can restore the original quality grade of the material. Milled and activated cement offers accelerated hydration and increased concrete strength.

Cement activation techniques

Cement can be activated chemically or mechanically. Chemical activation uses special additives that form a shield for the cement particles to protect them from moisture. Mechanical activation involves the use of special dispersers (mills). These are often large devices that generate significant noise during operation and consume large amounts of electricity. Their capacity is also problematic, as the capacity of a ball mill drops significantly for cement with a mean surface area above 2500cm²/g. Implementation of new efficient equipment remains an important priority. This article deals with a new mechanical method.

The principle of ferromagnetic particle vortex layer device

One of the nost promising methods of improving cement efficiency is the application of electromagnetic fields, in particular, ferromagnetic particle vortex layer devices (Figure 1).



vortex layer device (AVS). 1 = Protective bushing;

> 2 = Inductor coil that generates a rotating electromagnetic field;

Left - Figure 1: A ferromagnetic particle

3 = Inductor coil case;

4 = Non-magnetic operating chamber;

5 = Ferromagnetic particles.

The design of the device is similar to an asynchronous motor without the rotor. The rotor is replaced with a non-magnetic operating chamber (4). The induction coil (2) creates a rotating electromagnetic field. The field closes in the operating chamber, limited by the case (3). The processed material is supplied to the operating chamber, which contains ferromagnetic particles (5).

The rotating electromagnetic field propels the ferromagnetic particles on complex trajectories, creating a vortex layer. This is where the cement is intensively mixed and pulverised with the simultaneous action of the electromagnetic field and local high pressures. The effect is not due to free impacts, but due to collisions of the particles and impacts of the particles on the walls of the operating chamber.

The surface area of the impact is sufficiently small and the impact points are positioned randomly relative to the symmetry axis of the colliding ferromagnetic particles, creating significant forces even at relatively low particle velocities. Besides, the quantity and frequency of particle collisions is high. Particle geometry (length and diameter) and the number of the particles loaded into the operating **GLOBAL CEMENT:** CEMENT ACTIVATION



MaterialFlexural strength (MPa)Compressive strength
(Day 28)Day 8Day 28(Day 28) (MPa)Unprocessed2.834.8614.51Processed3.736.0842.66

chamber are selected by experience and are dependent on the type of material being processed.

Application to cement pulverisation and activation

The inventor of the AVS device, Professor Logvinenko, was the first to use it for cement activation. In particular he researched how the mean surface area of the material depends on the duration of processing in the device. It was demonstrated that 10 minutes of processing increases it from 3080cm²/g up to 4965cm²/g, 20 minutes takes it to 5477cm²/g and 30 minutes can take it up as high as 6724cm²/g.

Globecore set out to research the properties of concrete made from sticky cement after processing in the AVS, specifically the ability to withstand high dynamic and vibration loads. It took CEM I 32.5 R cement with 80µm fineness and large agglomerated particles that had appeared after long storage.

The 30 minute long process with steel ferromagnetic particles was performed in a Globecore AVS-100 vortex layer device. Cement fineness after processing reached 5-10 μ m. Rectangular samples were made for concrete testing, with the dimensions of 0.04 x 0.04m x 0.16m (Figure 2). The sample was prepared with CEM I 32.5 R cement, standard multiple-size sand and water (0.4 water to cement ratio).

Table 1 shows that the flex strength of the samples increased by 30% on day eight after processing the material in the AVS device. The compression strength limit after pulverisation and activation in the AVS increased by a factor of 2.9.

Application of the AVS allows to economise cement and use less electricity. The power savings is due to the fact that, with a relatively small application of power, it is possible to obtain multiple breakers: the ferromagnetic particles in the vortex layer.

Other AVS applications in concrete production include magnetic water activation (without the particles), sand activation and common processing of sand and cement to obtain activated mix components. The devices can be retrofitted into the existing processing lines with minimal cost and effort. A part of the process line for sticky cement pulverisation and activation is shown in Figure 3. The results demonstrate that the AVS can also be efficiently used in the production of micro-cement and reflective flooring mixes.



Right - Figure 2: Concrete sample after testing.

Right - Table 1: Flexural and compressive strength test results for sticky unprocessed CEM I 32.5 R and the same cement processed for 30 minutes in a GlobeCore AVS-100 vortex layer device.

Right - Figure 3: Part of the process line for sticky cement pulverisation and activation.



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UK: Samson launches new generation STORMAJOR®

Samson Materials Handling Ltd, a UK subsidiary of Germany's Aumund Group, has launched a new generation of the STORMAJOR[®]. The company says that the new, updated design improves handling and stability in the loading and reception of all kinds of bulk materials.

The new generation machine is available in three models: The STORMAJOR[®] 380 Series - for materials with a bulk density $\leq 1t/m^3$ such as alternative fuels; The STORMAJOR[®] 450 Series - for materials with bulk densities from 0.9-1.6t/m³ such as additives or light minerals, and; The STORMAJOR[®] 800 Series - for materials with bulk densities from 1.5-2.1tm³, such as heavier minerals or ores, sand and gravel.

Samson says that the new STORMAJOR® design is the result of decades of experience with the previous generations of these machines from Samson. It combines a mobile truck unloader with a moveable boom. This versatile unit allows the operators of ports, goods depots and stockpiles to receive bulk materials directly

Ireland: Quinn launches new range

Quinn Cement has launched a new range of bagged cement products in Ireland, following its launch previously in the UK. The company invested over Euro3m in its cement plant to bring the new range to the market, which includes three new cement products: General Purpose Cement, Master Grade Cement and Premium Grade Cement.

General Purpose Cement is intended to be a versatile cement product, suitable for general use, particularly in smaller jobs and repairs. Master Grade Cement is targeted at plastering and mortar due to its workability. Premium Grade Cement is a high-strength product at 42.5N.

US: Illinois Cement installs Roll Gen

Ilinois Cement has installed a Roll Gen System supplied by Martin Engineering at its La Salle plant in Illinois. The power station supplies energy to a remote conveyor location at the site. The patent-pending design uses the kinetic energy of the moving belt to generate enough electricity to drive an automated dust suppression system, a pneumatic belt cleaner tensioner and a series of air cannons, helping operators at the Illinois Cement Plant reduce dust and spillage, increase cargo flow efficiency and minimise labour costs for cleaning and maintenance.

The Martin Roll Gen System is designed to create a self-contained mini power station that allows operators to run electrical monitoring systems, safety devices and a variety of other components. Martin from trucks, front-end loaders or other loading equipment and to load them into vessels or railway wagons. As the new STORMAJOR[®] is fully mobile, it is also ideal for efficient stockpiling of bulk materials.

Below: The New Generation STORMAJOR® from SAMSON Materials Handling Ltd. Source: SAMSON Materials Handling Ltd.



UK: Aggregate Industries signs Euro3.3m Siemens deal

Aggregate Industries, a member of Lafarge-Holcim, has signed a Euro3.3m deal with Siemens for technology and training services.

The agreement positions Siemens as Aggregate Industries' preferred technology supplier across the company's 330 UK sites. The partnership is intended to improve efficiency, make maintenance savings, and reduce the company's carbon footprint. Siemens technology solutions include inverter drives, gearboxes, motors and control panels.

Engineering says that the device is considered a 'significant' step toward eliminating power production obstacles, as conveyors move into the next generation of 'smart systems.'

"Running auxiliary power can be both complicated and costly, requiring expensive labour and oversized cables to accommodate the inevitable voltage drop over long runs, as well as transformers, conduit, junction boxes and other components," said Andrew Timmerman, Product Development Engineer at Martin Engineering. "The entire project has been a success, particularly in how many man-hours we save in maintenance and upkeep. The tensioning system does a great job, and the Roll Gen puts out enough power that we're considering adding an automated secondary cleaner and a vibrating dribble chute to capture even more carryback."

CEMENT NEV

Philippines: San Miguel contract for Loesche

San Miguel Northern Cement has ordered two mills from Germany's Loesche for a new 5000t/day production line at its Sison plant in Pangasinan. The scope of supply includes two complete grinding plants: a type LM 56.4 mill for cement raw material and a type LM 35.3 D for sub-bituminous coal.

Loesche will supply a majority of the electro-technical components for the line and the automation systems, including its LM Master product. It will be responsible for the plant engineering and the supply of filters and blowers. The new line will use also A-TEC's Hurriclon technology for de-dusting the raw mills. Delivery of the order is scheduled for the start of 2019.

Finland: Metso celebrates 150 years of operations

etso is celebrating its 150th anniversary with a photo exhibition illustrating how the company has taken part in shaping and building the modern world. Interim chief executive officer (CEO) and chief financial officer (CFO) Eeva Sipilä opened the event on 18 September 2018 at Sanoma House in Helsinki. The exhibition will be open to the public until the end of September 2018.

The company was first established in 1868 when Erik Jan Hammarberg set up the Sunds Bruk ironworks in Sweden. As the business developed, its products and services widened and its ownership changed. In 1991, the operations became part of Rauma-Repola. Rauma then merged with Valmet in 1999 to form Metso. At present the company operates in more than 50 countries and has over 12,000 staff. It serves the mining, aggregates, recycling and process industries.

Cyprus: New Vassiliko product

assiliko Cement has launched a low hydration heat cement product, Portland Pozzolana Cement CEM II/A-P 42.5N-LH. It will be targeted at larger construction projects, such as footing or dams, where it prevents the formation of micro-cracks in the concrete.



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UK: Dunbar upgrade approved

he planning department of East Lothian Council in Scotland has granted planning permission to an upgrade of Tarmac's Dunbar cement plant. The work will include building a new cement grinding mill, a new cement storage silo and a rail loading facility. The work will also include a shed, belt conveyors, pneumatic pipelines and associated works.

In its supporting statement the company said that the new cement mill was neces-



sary to produce new grades of cement required for modern construction and the cement market. The proposed mill will replace two existing mills on the site and is intended to be more energy efficient and quieter than the existing mills. It added that the plant would benefit from rail sidings on both the south and north side of the East Coast Mainline railway line. At present trains are fed only on the south side using adjacent silos where train capacity is already fully used. Additional products are exported by road.

Germany: International VDZ Congress held in Düsseldorf

The 8th International VDZ Congress has taken place successfully in Düsseldorf, Germany. Delegates were welcomed on 26 September 2018 by Christian Knell, President of VDZ, and heard from 40 presentations on all areas of cement production on 26-28 September 2018. A report from the event will be included in the November 2018 issue of Global Cement Magazine.



UK: Cemex to re-start line at South Ferriby

Cemex is planning to restart commercial production on the second kiln at its South Ferriby cement plant in November 2018. The company says that this investment highlights its confidence in the long-term potential of the UK building materials market.

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The kiln has a capacity of 1000t/ day and was originally installed in 1973. Since then the cement producer has conducted upgrade work on the production line to comply with environmental legislation and to install new electrical infrastructure, a control system and instrumentation. The second kiln was previously the first Cemex line in the world to achieve a 100% alternative fuel substitution rate in 2011. Once fully operational, the two kilns at the plant will give it a production capacity of 0.7Mt/yr.

Germany: Consumption up 4.8% in 2017

he German Cement Works Association (VDZ) says that cement consumption grew by 4.8% year-on-year to 28.8Mt in 2017. It has attributed this boost to higher investments in new construction work and acknowledged the benefits of good weather. However, the association expects much lower growth in 2018. Data from the German Federal Statistical Office indicates that domestic demand for cement was almost completely covered by Germanbased producers in 2017. Only 1.6Mt of cement or 5.4% had to be imported. This figure has increased slightly compared to the preceding years. The same applies to cement exports, which rose by 1.6% to a total of around 6.2Mt.

"Potential for growth is still evident in certain construction sectors. However, it is becoming increasingly difficult to exploit this as we are reaching capacity limits in the construction industry," said VDZ president Christian Knell.



GLOBAL CEMENT NEWS: EUROPE

UK: Breedon benefits from Lagan purchase

Breedon Group has reported its first half results for 2018, which showed a 16% year-on-year increase in revenue to Euro419.3m and a 3% fall in profit before tax to Euro33.7m. The group completed the acquisition of Ireland-based Lagan Group during the period under review, as well as other companies in the UK.

Peter Tom CBE, Executive Chairman, commented, "This was one of the busiest periods in the Group's history, with four acquisitions completed by 1 July 2018, including our first outside Great Britain, coupled with continued organic investment in a number of key projects. We had anticipated a challenging 2018 and so it proved in the first half, with testing trading conditions exacerbated by the severe weather in the first quarter and rising input costs throughout the period. Despite these headwinds, we delivered a resilient performance."

"We continue to view the medium- to long-term outlook in Great Britain positively, with infrastructure spending forecast to increase steadily over the next three years and government strategies to address our chronic housing shortage expected to fuel continued growth in the residential sector. Market conditions in Ireland are expected to be even healthier, with construction output in the Republic forecast to grow by approximately 28% in the three years to 2020 and Northern Ireland expected to sustain construction output at approximately Euro3.33bn/yr from 2018 to 2022."

Germany: Drop in NO_x during 2017

Environmental data from the German Cement Works Association (VDZ) show that average nitrogen dioxide emissions (NO₂) from cement production dropped below 300mg/Nm³ in 2017. The value has more than halved since 2000. Other data from the *Environmental Data of the German Cement Industry 2017* report shows that fossil fuels usage by the cement industry fell to 35% in 2017 compared to 45.6% in 2008.



"By consistently promoting the development of clinkerefficient cements, German cement manufacturers are noticeably reducing the carbon footprint as compared to traditional Portland cements," said VDZ President Christian Knell. Knell also warned that the costs of CO₂ capture technologies should not be allowed to jeopardise the competitiveness of domestic cement manufacturers and give rise to 'undesirable' carbon leakage effects. The industry is currently researching other methods to reduce CO₂ emissions such as CO₂ capture, storage and utilisation, but it is dependent on external financing.

Bosnia & Herzegovina: Asamer to force Cementa Lukavac buyout

A ustria's Asamer Baustoff plans to force a buyout of Fabrika Cementa Lukavac to acquire the remaining 0.46% share of the cement producer it does not already own. The building materials company intends to use its right to transfer voting shares from minority shareholders to itself. The move follows a previous move to increase its share in the cement producer in June 2018.





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World: GCCA gains six new members

The Global Cement and Concrete Association (GCCA) reports that it continues to grow, with the addi-

tion of several new member companies from Europe, South America and Asia. In August 2018 there were six new members: Buzzi Unicem, Cementos Argos, Cementos Pacasmayo, Çimsa Çimento, SCG Cement and Titan Cement. The GCCA also welcomed the US Portland Cement Association (PCA) as an Affiliate.

Albert Manifold, GCCA President (and CEO of CRH) said, "We are delighted to welcome further cement and concrete companies and like-minded organisations to the GCCA. The GCCA

becomes even stronger."



World: New Cement Director for GCCA

he Global Cement and Concrete Association (GCCA) has appointed Claude Loréa as Cement Director.

> She will take up the role in early November 2018 and will be based at the association's offices in London. Loréa joins the GCCA from European cement industry body CEMBUREAU, where she is Deputy Chief Executive and Industrial Affairs Director. Loréa will report to incoming GCCA chief executive, Benjamin Sporton and will be a member of the executive team.

> Loréa will lead all aspects of GCCA work related to cement, calling for a practical understanding of

its chemistry, production, co-processing, data collection, standards as well as international climate policy, regulatory requirements and trends. With sustainability a key priority of the GCCA, she will also oversee the smooth transition of the activities of the Cement Sustainability Initiative to the GCCA.

Germany: Two dead at Schelklingen

Two workers have died in an accident at a construction site within the HeidelbergCement Schelklingen cement plant, when a 40m-high scaffold collapsed within a silo. Four others were involved, with one slightly injured. All six operatives had entered the silo from the top. Spokesperson Elke Schönig said that the scaffolding had become 'staggered' for unknown reasons and then partially collapsed. The incident is under investigation.

Ukraine: New CEO for Eurocement Vitaly Gorgoliuk has been appointed as the new

have been received and are being processed.

Chief executive officer (CEO) of Eurocement Group Ukraine. He succeeds Denis Galchev. Eurocement Group Ukraine is a unit of Russia's Eurocement Group.

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ment, Eurocement, HeidelbergCement, LafargeHolcim, Taiheiyo Cement, UltraTech Cement and Votorantim. Further applications for member and affiliate status

The new members and affiliates join 10 existing

Russia: PSK to build plant

Pervaya Stroitelnaya Kompaniya (PSK) plans to build a 1.2Mt/yr cement plant in the Petrovsky district of the Tambov region. The project has an investment of Euro126m, according to the Kommersant newspaper. The unit will use the Borisovsky deposit for its raw materials. PSK previously purchased the licence to develop the mine from Tambov-Cement company. The project is scheduled to be built from 2019 to 2025 in several stages.



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26 Global Cement Magazine October 2018

UK: New Breedon director

Peter Cornell joined the Board of Breedon Group as an independent non-executive director on 1 October 2018. He is a Partner in Metric Capital, a Special Situations Fund targeting midsized companies throughout Europe with approximately Euro2bn of assets currently under management.

Prior to founding Metric Capital with his two partners in 2011, Peter was a Managing Director at Terra Firma, one of Europe's leading private equity firms. He formerly spent more than 20 years with international law firm Clifford Chance, latterly as Global Managing Partner.

Peter is currently non-executive Chairman of Grant Thornton and Lexington Consultants, a professional service firm consultancy. He is also a non-executive director of Schroders Limited, F&C Commercial Property Holdings Limited and IE Business School in Madrid.

Spain: FYM two years accident free in Malaga

FYM-HeidelbergCement has reached a record two years without an accident at its Malaga cement plant. The milestone also includes no accidents for subcontractors working at the site. The company has operated a 'Zero Accident' program since 2000 that has focused on improving the safety culture for all staff.

Spain: New CEO for Votorantim in Spain

Votorantim Group has appointed Alan Svaiter as the chief executive officer (CEO) of Votorantim Cimentos España. He succeeds Jorge Wagner, who has been promoted to the role of CEO of Votorantim Cimentos Europe, Asia and Africa. In his new position Svaiter heads a subsidiary running four cement plants, two mills, 29 concrete plants, eight aggregate operations and one mortar plant. He also directs a team of more than 500 people.

Svaiter, a Brazilian national, joined Votorantim Group in 2008. After leading the logistics of its cement division for two years he was appointed the director of Engemix, the company's concrete business in Brazil. In 2014 he became director of the supply chain of the cement group for the entire Brazilian market.

Svaiter, a production engineer trained at the Pontifical Catholic University of Rio de Janeiro, holds a master's degree from the IN-SEAD business school. He started his professional career working for the Ambev brewery before joining the mining company Vale.

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Ireland: CRH results affected by weather

CRH's financial results for the first half of 2018 have been negatively affected by poor weather in Europe and North America. Its sales revenue rose by 1% year-on-year to Euro11.9bn in the reporting period. Its earnings before interest, taxation, depreciation and amortisation (EBITDA) increased by 1% to Euro1.13bn from Euro1.12bn.

"We have had a good first half, despite significant weather disruption in Europe and North America in the first quarter. Construction markets continued to recover and pricing gathered momentum in key European markets, while there was solid volume and price growth against a positive economic backdrop in the Americas," said chief executive Albert Manifold. He added that the company was experiencing 'challenging' conditions in the Philippines.

Ireland: CRH audit up for grabs

A Euro22bn audit of CRH has been put out to tender, as mandatory rotation rules require it to replace incumbent EY. The move was announced in CRH's 2017 annual report, which said EY would have to be replaced by 2021 in order to comply with European Union (EU) rules designed to increase the independence of auditors.

Ireland has adopted a strict interpretation of the EU rules by requiring financial institutions and listed companies to replace auditors every 10 years. This contrasts with the UK's more liberal regime, which only requires audits to be put out to tender every 10 years, leaving companies free to reappoint their existing auditors. EY is based in the UK. It is possible that CRH may be seeking to reappoint a non-UK firm prior to the UK's departure from the EU on 29 March 2019.



Ireland: CRH to amass Euro7bn

CRH has said that is looking to build up a 'cash pile' of Euro7bn. It says it will use the funds for anything from acquisitions to share buybacks. Finance director Senan Murphy said the company was showing the market that it is 'not just a one-trick pony that just does acquisitions.' The money will be the cash left over after spending on capital expenditure, interest, tax and other payments.

"There are a number of options where that money can be deployed, and we will deploy it wherever it creates the most value for shareholders," said Murphy. "We can reinvest it in our business, we can invest it in acquisitions, we can continue on with buybacks or we can increase the level of dividends."

The company posted a 1% rise in revenue and earnings before interest, tax, depreciation and amortisation (EBITDA) year-on-year in the first half of 2018. It expects EBITDA in the second half to be ahead of that seen in the second half of 2017.

Ukraine/Russia: Ukraine bans imports from Russia

Ukraine's Cabinet of Ministers has banned clinker imports from Russia. The government says that cement imports from Russia almost doubled in 2017. Its share in total imports in 2017 was 85-87%, and in January - May 2018 it grew to 100%.

"The introduction of cement clinkers into the list of goods banned to import into Ukraine from Russia is carried out as part of the policy of economic opposition to discriminatory actions against Ukraine by the



aggressor state," said the Ministry of Economic Development and Trade. It added the ban is expected to increase local production. Although a cement deficit is not expected, the ministry said that, if necessary, additional clinker could be imported from the European Union (EU).

Ukraine: Production falls in July 2018

Production of cement in Ukraine fell by 4.7% to 0.96Mt in July 2018 compared to the same month in 2017, according to the State Statistics Service. Production was also 6.1% less than in June 2018.

In the first seven months of 2018, cement production fell by 3.7% to 4.97Mt. Cement production was 9.31Mt for the whole of 2017.

Left: A border guard on the Russian side of the border with Ukraine. Source: E. Kryzhanivskyi / Shutterstock.com.

CEMENT NEWS

UK: Cookstown plant celebrates 50 years

Aggregate Industries is celebrating 50 years of production at its Cookstown plant in Northern Ireland. The plant opened in 1968 and today it employs almost 100 staff, both in Cookstown and at a cement terminal in Belfast. Lafarge Cement was later acquired by Aggregate Industries in 2015 as part of the merger between Lafarge and Holcim that created LafargeHolcim.

"50 years is a significant milestone and follows the successful 60th anniversary celebrations that took place at our sister cement plant in Cauldon in 2017," said plant manager Russell Larmour. "The success at Cookstown is testament to the many generations of people here in County Tyrone who have helped shape the business today. As we now look to the future, and many more years of production, we are committed to maintaining our position as a leading, sustainable business partner at the heart of the UK's construction industry."

Ukraine: Counterfeit cement

Ukrcement, the Ukrainian cement association, has found in a study that over 80% of cement with the wrong labelling was counterfeit. The research was conducted on 50 cement bags for the consumer market, according to Interfax. 82% of cement proved to be counterfeit, over 50% of the samples were below the declared weight and 56% had weaker strength and did not comply with the B.2.7-46 -2010 national standard for minimum compressive strength.

The association said that the risks of using counterfeit cement vary from loss of time and revenue in smaller projects to a direct threat to human life in larger projects such as high-rise buildings. Local regulations require that cement bags include five items: the name of the producer, the conventional designation of cement, the designation of the normative document, the net weight and a conformity mark.



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Global Cement staff

GLOBAL CEMENT: EVENT REVIEW

Picture Review: RWM 2018

The *RWM Exhibition* on recycling and waste management took place at the National Exhibition Centre (NEC) in Birmingham, UK on 12-13 September 2018. The event featured over 500 exhibitors, attracted around 20,000 visitors with 350 seminars and 30 panel sessions. *Global Cement* was once again in attendance. Here, we showcase selected cement-relevant exhibitors, many of which are involved in the preparation and handling of waste-derived alternative fuels.















1: Discussions on the MoistTech Corp. stand. The company manufactures moisture sensors for a variety of applications, including for alternative fuels like refusederived fuel (RDF) and dried sewage sludge.

2: Representatives from Keith Manufacturing Company smile for the camera. The firm produces walking floor trailers applicable for a range of cement sector uses, including alternative fuel handling.

3: Jos Martens of DrySep. The company makes the Q-Toploader, a unique and fully-automated storage and dosing system. See DrySep at the *Global CemFuels Conference & Exhibition* in Amsterdam on 20-21 February 2019.

4: Discussions on the stand of UK waste management solution expert Totus Environmental.

5: Finland's BMH-Technology, producer of the Tyrannosaurus line of crushers for alternative fuel preparation.

6: Netherlands-based alternative fuel producer N+P. The company's Subcoal® production plant will be visited as part of *Global CemFuels Conference & Exhibition* in Amsterdam on 20-21 February 2019.

7: Blade and knife manufacturer Fernite of Sheffield will exhibit and give a presentation at the forthcoming *Global Gypsum Conference & Exhibition* in Vancouver, Canada on 25-26 October 2018.









8: Representatives of Swiss-based SID SA, a manufacturer of shredders.

9: Staff from Finnish flue gas analyser manufacturer Gasmet.

10: New West Gypsum Recycling (NWGR), the world leader in gypsum wallboard recycling. The company has nine plants across North America and Europe. Read about the company in the forthcoming November 2018 issue of *Global Gypsum Magazine*. NWGR will exhibit at the *Global Gypsum Conference & Exhibition* in Vancouver, Canada on 25-26 October 2018.

11: KKR ProStream, experts in industrial plant cleaning / maintenance, including cement plants.





11: Saxlund International, producer

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Global Cement Magazine October 2018

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Ad Index

Brazil: Buzzi buys partner out of BCPAR

taly's Buzzi Unicem has announced that it has reached an agreement to buy a 50% stake in the Brazilian company BCPAR from Grupo Ricardo Brennand for Euro150m. BCPAR operates two integrated cement plants one in the part state of

ment plants, one in the north east state of Paraíba and one in the south east state of Minas Gerais. The Minas Gerais plant started operations in May 2011 and has an annual production capacity of 2.4Mt/yr of cement. The Paraíba plant was commissioned in August 2015 and it has a capacity of 1.7Mt/yr. Buzzi Unicem will retain the right to buy the remaining 50% of BCPAR from Ricardo Brennand until 1 January 2025.

Buzzi Unicem said in a press release that the agreement reached allows it to extend its industrial operations to the largest economy in South America and improve the geographical diversification of its regional presence. Buzzi Unicem believes that the current down-

turn in the Brazilian economy, and in particular of the local cement industry, can be positively resolved, starting from 2019. It adds that Brazil's key macroeconomic data concerning cement production are encouraging. The population is expected to grow at an average rate

of 1.1%/yr and per capita cement consumption is currently at its lowest levels in years.

Brazil: Cemex Latam to sell CVDA stake

Cemex Latam Holdings (CLH), the subsidiary of Mexican cement company Cemex in Central and South America and the Caribbean region, together with its subsidiary Corporacion Ce-

mentera Latinoamericana, expect to finalise the sale of Brazilian cement producer Cimento Vencemos Do Amazonas (CVDA) for around US\$30m by the end of 2018. On 25 May 2018, the pair agreed to sell all of the shares they own in CVDA to Brazilian cement company Votorantim Cimentos.

Argentina: Cement sales rise rapidly

Both the sale and consumption of cement grew by 17% in August 2018 compared to July 2018, according to the national government. With sales of 1.1Mt, August 2018 also grew 0.1% compared to August 2017.

"The August figures are very positive in this economic context, which shows that construction, public and private, continues to advance," said Guillermo Dietrich, Minister of Transportation. "The sale of cement maintains the same values as in August 2017, setting a historical record. We are facing the most ambitious infrastructure plan in history and that does not stop."

Dominican Republic: Strong first half for Cementos Argos

Colombia's Cementos Argos has announced that it recorded positive results in the Dominican Republic during the first half of 2018. In this period, the company saw overall revenues experience a year-onyear increase of 7%, while net profits expanded by 23%. These positive results helped the company to report a good performance in its Caribbean-Central American regional operations, which recorded earnings before interest, tax, depreciation and amortisation (EBITDA) of US\$99m and revenues of US\$299m, marking increases of 3.9% and 2.6%, respectively.



Uruguay: ANCAP struck hard

An 88 day strike has reduced cement sales at Administración Nacional de Combustibles, Alcoholes y Portland (ANCAP). Its cement sales fell by 24.1% year-on-year to 0.12Mt in the first half of 2018 from 0.16Mt in the same period in 2017. Despite this, the loss from its cement business decreased to US\$3.4m from US\$6.06m. Its earnings were also negatively affected by rising petcoke prices. Overall, the oil and gas company reported a profit of US\$52.6m across all business lines.

Colombia: Production on the wane

Cement production reached 1.02Mt in Colombia in July 2018, a 5.2% year-on-year fall compared to July 2017, according to DANE, the country's statistics authority. In July 2018 the country shipped 0.99Mt to the domestic market, a 4.7% year-on-year fall.

So far in 2018, cement production reached 6.98Mt, a decrease of 1.8% compared to the period January -July 2017. In the 12 months to the end of July 2018, cement production reached 12.2Mt, a decrease of 2.2% compared to the period August 2016 to July 2017.

NEWS: AMERICAS

Bolivia: Fancesa sues hauliers

The cement producer Fancesa has started legal action against transport industry leaders Oscar Reynolds and Macguiver Rosales over threats and criminal association, after they stopped transporting its cement. Fancesa earlier reduced the rate paid to hauliers to transport cement from its plant to Santa Cruz by 13.7% to US\$1.88/bag (50kg), prompting hauliers to stop transporting its cement.



Chile: Polpaico profit perks up

Cemento Polpaico, part of LafargeHolcim, reported a profit of US\$5.93m in the first half of 2018, a 52.6% rise with respect to the US\$3.9m profit it achieved in the first half of 2017. Its operating revenues from continuing activities were US\$120.7m, a 32.2% year-on-year increase.

The company reported that the higher operating revenues were mainly due to an increase in sales volumes of cement and concrete, driven by the greater economic activity.



Bolivia: Emisa to close Oruro

Emisa has reported that it will stop cement production at its plant in Oruro to concentrate on cement distribution instead. Its existing mills were built in 1946 and their technology is now outdated. Local workers were offered either jobs in other plants, voluntary retirement or a redundancy package.



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US: Cemex celebrates 50 years of Balcones quarry

Cemex has celebrated the 50th anniversary of its Balcones Quarry in New Braunfels, Texas with an event attended by Cemex USA Regional President -Texas and New Mexico Region Joel Galassini, and which included a planned quarry blast.

Balcones Quarry began operations in 1968. Cemex purchased the quarry along with the neighbouring cement plant in 1994. The quarry currently processes more than 10Mt/yr of crushed limestone annually and supports infrastructure, residential and commercial projects across Texas. The United States Geological Survey (USGS) recently ranked the quarry as the top crushed stone producer in the country in volume terms.



Above: A CAT993 loader and CAT hauler in the Cemex Balcones quarry.

US: New manager for Vicksburg lime

Mississippi Lime Company has appointed Kenny Adams as the Plant Superintendent of the Vicksburg lime plant in Mississippi. He holds over 20 years of experience in plant production. He joined the company's Verona plant in 2010 as a Lead Kiln Operator. In 2014, he was promoted to Supervisor. In his new role, he will oversee Vicksburg's production and support operations.

Brazil: Cade approves loyalty scheme

Brazil's antitrust watchdog Cade has approved a joint-venture between Votorantim Cimentos, Tigre Participações and Gerdau Aços Longos for a construction materials products loyalty scheme. The initiative will be called Juntos Somos Mais. Votorantim Cimentos will hold a 45% share of the scheme. The civil construction materials company Tigre and Gerdau Aços Longos, the steel division of the Gerdau, will hold a 27.5% share each.

Cade said that the companies will remain operationally and commercially independent in their main activities, so that the only common ground between them will be the functioning of the coalition's loyalty program. Other companies in the construction industry will be able to join the program as partners.

Argentina: New director for Holcim

Carlos Casado has become the new Director of Operations at Holcim Argentina. He previously held positions for Holcim and LafargeHolcim in Europe, Asia and Latin America. He will be based in Córdoba and will control plants in Córdoba, Jujuy, Mendoza and Buenos Aires. Casado is an industrial engineer from the Polytechnic University of Valencia, Spain, who has 17 years of experience in the LafargeHolcim group.

Brazil: Vicat confirms Ciplan talks

France's Vicat has confirmed that it is in talks with Ciplan. Local newspaper Valor Econômico revealed that Vicat was in the 'final stages' of buying the cement producer. Ciplan was founded in 1968 and it operates an integrated plant at Sobradinho in Bahia near to Brasilia.

US: LafargeHolcim buys Metro Mix

afargeHolcim has acquired Metro Mix LLC, a leading provider of ready-mix concrete in the Denver metropolitan area in Colorado. With Metro Mix, LafargeHolcim reports that it has further strengthened its position in the United States, where it is already present with operations in cement, ready-mix concrete, aggregates and asphalt.

Jan Jenisch, CEO of LafargeHolcim, said, "This is our fourth acquisition this year, in line with our Strategy 2022 - 'Building for Growth'. Metro Mix's operations are highly complementary to our existing footprint and will allow us to gain a larger share in a growing market with immediate commercial and operational synergies. I very much welcome all employees of Metro Mix to our company."

Metro Mix operates two ready-mix concrete plants and reported net sales of around US\$30m in 2017.

Paraguay: New President for INC

The government has appointed Javier María Rodríguez as the president of Industria Nacional del Cemento's (INC). He succeeds César Bogado, who was the interim president of the state-owned cement producer, according to the La Nación newspaper. Julio Ullón, the head of the civil cabinet, welcomed Rodríguez to the role and urged the new administration to 'continue to win national demand.'

NEWS: AMERICAS

Colombia: Argos stays on DJSI

Cementos Argos has been ratified for the sixth consecutive year as a member of the Dow Jones Sustainability Index (DJSI), which recognises good practices in terms of economic, environmental and social sustainability of the companies registered in stock markets. Celsia, a Grupo Argos energy subsidiary, was also included in the Dow Jones Sustainability Index for the Latin American Integrated Market (MILA) - Pacific Alliance, which recognises companies with the best economic, social and environmental practices in Chile, Peru, Mexico and Colombia. Grupo Argos and Cementos Argos were also included.

"Being ratified as world leaders in sustainability by Dow Jones is the result of our conscious investment, our commitment to a responsible operation of all our businesses, and our permanent interest to positively impact society, respecting our planet," said Jorge Mario Velasquez, chief executive officer (CEO) of Grupo Argos.

In 2018 more than 3500 companies around the world were invited to participate, but only 317 were selected as members of the worldwide DJSI.

Canada: New manager for Lafarge Exshaw

Kate Strachan has become the new plant manager of the Lafarge Exshaw plant in Alberta, the largest in Canada. She took up the position in June 2018.

Born and raised in Warrington, UK, Strachan moved to Canada with her family when she was 10 years old, following her father's job in marine engineering. She graduated from the University of Victoria with a mechanical engineering degree in 2000 before joining Lafarge Canada's Richmond plant in the mechanical engineering department. Over the next 12 years she moved up through the mechanical department, eventually becoming the maintenance coordinator and then production coordinator at the plant.

After holding that position for several years she was promoted to production manager for Lafarge's Sugar Creek plant in Missouri, US, but returned to Canada in less than a year to assist with the Exshaw plant's US\$600m expansion. "The commissioning of a new plant line is a once in a lifetime opportunity, so it was something I couldn't really pass up," said Strachan.



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After spending nearly two years as the plant's production manager, Strachan assumed her new role as plant manager in June 2018, taking over from Jim Bachmann, who was the plant manager since 2015.



Above: The Lafarge Exshaw plant in Alberta, Canada.

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a 50% substitution rate of clinker, surpassing the 35%

limit normally encountered when using secondary

cementitious materials such as fly ash. However, the

process requires capital outlay in the form of either converting a redundant rotary kiln or building a flash

calciner to calcine the clay. Converting an old kiln is

recommended for smaller quantities of clay, 500t/

day or less. Thus, a portion of this presentation was

devoted to comparing the costs of treating the clay

in various scenarios with the payment time ranging

from around one year for sites next to a clay source

to up to six years where the raw material was up to

200km away. Tests have been run at the Siguaney

plant in Cuba since 2013 and the technology has the

potential to reduce CO₂ emissions by 35% compared

David Perilli, Global Cement Magazine

Review: FICEM 2018

The Federación Interamericana del Cemento (FICEM) held its 2018 Technical Congress in Panama City on 3-5 September 2018, with 355 delegates attending from 29 countries. Technically the conference was strong, with plenty of local case studies interspersed with presentations looking at sustainability and commercial activities...

rnaud Pinatel, On Field Investment Research Aprovided the sole regional overview. The key local news was that the Latin American sector's production capacity had grown by 3% from 2010 to 2018 but that prices had fallen during this time. The forecast suggested that cement sales volumes were expected to grow by 3% in 2019 - supported by Brazil, Peru and Bolivia - but that prices were also expected to fall by 1%, mainly due to issues in Argentina. Other interesting snippets included the breakdown of new production capacity in Latin America as being dominated by major local players (just over half of capacity) followed by multinational producers (about a quarter).

Harry Abuchaibe of Argos Panamá provided some local flavour with his description of a market experiencing stable growth over the last decade and cement's place as one of the four main industrial participants of gross domestic product (GDP). Later, Anabeith Morales described an emissions reduction programme at Argos Panamá's grinding plant. By changing the grinding load and using solar energy for air conditioning the unit saved 18MWh or just over US\$3m between 2015 and 2018.

Laurent Grimmeissen, Cementis and Adrián Alujas Diaz, Universidad Central de las Villas, looked at the LC3 project using calcined clay to reduce the clinker factor of cement. The method offers



work saw clinker production rise to 2200t/day from 2000t/day. Following the project, and with work at its Villeta grinding plant, INC estimates that it has decreased the price of cement by 15.5% locally.

filters, changing the ID fan, changing the burner

and installing a new FLSmidth 17.5 ATOX mill for

coal and petcoke grinding in 2016 and 2017. The

Waldo Mariscal, UNACEM Peru, discussed how the Condorcocha cement plant has saved water. The site uses an 18km canal to bring in water from the mountains and previously it used an open circuit cooling system. As the plant grew, it wanted to control its water consumption better. This was achieved by building new reservoirs and creating a closed-loop water system with natural heat transfer to cool the water ambiently. From 2006 the change enabled the plant to reduce its consumption from 32L/s in 2006

1: Delegates of the FICEM Technical Congress 2018 squeeze into the lobby of the Megapolis Convention Centre in downtown Panama City. Source: FICEM.



GLOBAL CEMENT: EVENT REVIEW











2: Left to right: Andrés Jiménez (Director of Cemex Panama), Mario Estuardo Orellana Vítola (General Manager of Cementos Progreso), Maria José García (FICEM), Adolfo Gramajo (FICEM) and Alejandro Ramírez Cantú (FICEM) open the exhibition. **Source:** FICEM.

3: The conference field trip visited the Cocoli Locks on the Pacific side of the Panama Canal. **Source:** FICEM.

4: Alejandro Ramírez Cantú, President of FICEM, welcomes delegates to the 2018 technical congress in Panama City. Source: FICEM.







to 2L/s in 2016, far below its authorised usage level. Alongside this, the plant increased production to 7800t/day in 2016 with a new clinker line in 2012 and a new cement mill in 2015.

Other technical talks of note included Félix Mendez's examination of using fluorite as a mineralising agent for clinker at Cementos Argos Honduras' Piedras Azules plant, Luis García's detailed presentation of a project by Motofrenos to replace a seal system of a kiln at a Cementos Melon plant in Chile and Cristian Flores' results from using a DALOG online monitoring system for electrical motors at the Cementos Progreso San Miguel plant in Guatemala.

Sustainability themes were prominent, given environmental concerns and the region's rapid urbanisation. **Patricio Díaz** of UNACEM Ecuador described his company's part in disposing of chlorofluorocarbons (CFCs) in a cement kiln to support a government refrigerator disposal scheme. The plant destroyed 2.5t of CFCs in 2018 following Japanese government guidelines from 1999. The speaker said this was equivalent to eliminating the warming effect of 27,300t of CO_2 . **Rosa Chirinos**, UNACEM Peru, gave an overview of the company's role in government housing schemes in Lima by donating cement to residents near its plant and by supporting better construction methods. 72% of housing in the city is informal, with illegal land occupation common. There is widespread disregard for planning regulations and even basic structural building norms, leading to issues from social disquiet to building collapses. By supporting the project UNACEM has already helped more than 200,000 families.

The conference concluded with a field trip to the Cocoli Locks, a Pacific-side expansion to the Panama Canal that was officially opened in 2016. Both Cemex and Argos Panama supplied cement to the project. Indeed, Cemex Panama invested over US\$300m in its local plant to triple production in support of the expansion. Few modern infrastructure projects illustrate better the power of the cement industry to transform the world than the Panama Canal. The FICEM Technical Congress will return in 2019 at a location yet to be announced.

5: Arnaud Pinatel, On Field Investment Research, presents the Latin American findings of his company's new market report. Source: FICEM.

6: Andrés Jiménez, Director of Cemex Panama, discusses the Panamanian market. Source: FICEM.

7: Waldo Mariscal, UNACEM Peru, explains how the Condorcocha cement plant significantly reduced its water consumption by moving to a closed loop system. Source: FICEM.

8: Adrián Alujas Diaz, Universidad Central de las Villas, talks about technical aspects of the LC3 calcined clay project from the Siguaney cement plant in Cuba. **Source:** FICEM.

9: Lisseth Sandoval wins the cash prize for best presentation. Her paper looked at the rehabilitation of Cementos Argos' San Antonio quarry in Colombia. **Source:** FICEM.

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Mahendra Singhi, the group chief executive officer (CEO) of Dalmia Cement, says that the company aims to be carbon negative by 2040. Singhi made the announcement at the Global Climate Action Summit in San Francisco, US, according to the Indo-Asian News Service. The cement producer is planning to increase its low-carbon product portfolio and use more 'green' fuels and raw materials at all of its 14 plants in India.

Dalmia Cement is the first Indian cement company to join RE 100 and it is committed to a target of 100% renewable electricity use. Singhi said that the major challenge is to convert the climate risks into business opportunities while sustaining business growth for the benefit of present as well as future stakeholders. Singhi was previously the Indian co-chair of the Cement Sustainability Initiative (CSI).

Singhi said that Dalmia Group has been able to reduce carbon dioxide emissions to 526kg/t of cement on a group average and to 342kg/t in its eastern operations. According to CDP (formerly the Carbon Disclosure Project) cement sector report in April 2018, Dalmia Bharat achieved the first rank in CDP's low carbon transition league.

Read more about Dalmia Cement's CO_2 negative plans in the November 2018 issue of Global Cement Magazine, as well as our full report on cement in India.

India: Singhi is new NCB Chairman

The National Council for Cement and Building Materials (NCB), has appointed Mahendra Singhi, Group CEO of Dalmia Cement (Bharat) Ltd as its new Chairman. Mr Singhi has been a part of the board of Governors of NCB since 2013.

Commenting on the occasion, NCB Director General, Ashutosh Saxena, said, "We are fortunate to have someone of Mr Singhi's calibre and experience to lead NCB. We are at a critical phase of development of our centres of excellence and we need renewed leadership to successfully implement our research, strengthen our technology initiatives and take advantage of the opportunities ahead for sustainable development of cement and construction sector. Mahendra Singhi is a technology visionary with a proven track record of execution. Furthermore, as a member of NCB's board of governors for the past five years, he has a deep understanding of its capabilities and potential."



Above: A busy street scene in Kolkata. Source: Radiokafka / Shutterstock.com

Iran: Cement exports rise by 32%

Cement exports from Iran registered growth of 32% during the first four months of the country's current fiscal year (20 March 2018 – 22 July 2018), according to the Islamic Republic's Customs Administration data.

The country exported US\$107m worth of cement during the period. The volume rose to 2.7Mt, 24% more than in the comparable period of the previous fiscal year. The country also exported 2.2Mt of clinker worth US\$60m in the same period of time.

Iran exported cement to 27 countries across the world in the period, including Kuwait, Iraq, Afghanistan and Bangladesh, with exports to Oman and Kuwait growing strongly.

The latest data of the Iranian Ministry of Industries, Mining and Trade says that the country's total cement output amounted to 13.36Mt during the same first quarter period, a year-on-year fall of 5.7%.

Pakistan: Surprise fall in sales in August

Overall cement sales in Pakistan fell by 2% year-on-year to 7Mt in the first two months of the current fiscal year, which began on 1 July 2018. Domestic sales dropped by 5.3% to 5.9Mt, while exports increased by 21.5% to 1.1Mt. A spokesperson from the All Pakistan Cement Manufacturers Association (APCMA) said that the industry had been expecting slower growth at home but had not expected a contraction. In July 2018 overall sales had grown by 5% but they fell by 8% in August 2018.

India: KCP unit is India's most efficient

The KCP Ltd cement unit II at Ramakrishnapuram in Krishna district has bagged the 'Excellent Energy Efficient Unit' award from the Confederation of Indian Industry (CII). The award is given to the cement plant with lowest specific electrical energy consumption for cement production compared to the national average and lowest specific heat consumption for clinker production as against the industrial average.





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Australia: Boral reports modest rise in sales in year to June 2018

Boral's cement business, Boral Australia, reported a 2% year-on-year rise in cement sales volumes in the financial year to 30 June 2018. Its external sales fell but this was compensated for by growing local sales in support of its concrete business. It said that the earnings and margins for its cement business improved due to an improvement programme. However, these benefits were partly offset by cost inflation and higher energy costs.

Overall, Boral Australia's sales revenue rose by 34% year-on-year to US\$2.62bn in the financial year to 30 June 2018 from US\$2.40bn in the same period in 2017. Boral Australia's earnings before interest, taxation, depreciation and amortisation (EBTIDA) increased by 15% to US\$462m from US\$402m. Total group sales rose by 34% to US\$4.28bn and EBITDA grew by 47% to US\$770m due to the acquisition of Headwaters.

Pakistan: Thatta profit rises 35%

Thatta Cement's standalone sales fell by 22% to US\$23.1m in the financial year to 30 June 2018 from US\$29.7m in the same period of 2016-2017. Its gross profit fell by 35% to US\$6.1m from US\$9.4m. Its profit for the year fell by 39% to US\$2.9m from US\$4.7m.

Kazakhstan: Steppe up 22%

S teppe Cement's sales revenue rose by 22% yearon-year to US\$32.8m in the first half of 2018 from US\$26.8m in the same period in 2017. The cement producer said that the local market grew by 5% and that it had increased its market share to 15.5% from 14.5%. Its sales volumes grew by 14% to 0.74Mt from 0.65Mt. It reported that its selling expenses increased as sales in the south and exports grew 'significantly.'

The company noted that the local market is expected to be 9Mt in 2018, a figure similar to 2017. Construction was reported 'strong' in the west and south of the country. Imports in the country have increased by 30% so far in 2018 to 0.34Mt. Exports increased to 0.92Mt from 0.45Mt due to demand from Uzbekistan.



"We have continued to optimise our networks and grow volumes in Australian east coast markets, where demand is very strong, and we continue to focus on full cost recovery through price and strengthening margins through improvement programs," said chief executive officer and managing director Mike Kane.



Nepal: US\$140m for Hongshi Shivam

A consortium of Nepal's five commercial banks has approved credit worth US\$140.5m to Hongshi Shivam Cement Private Limited, a Nepal-China joint venture company, in one of the largest ever finance pledges by Nepali commercial banks to any industry or infrastructure project. Company officials said that they would use the loan pledged by the commercial banks to start commercial production of cement at Hongshi Shivam's 6000t/day plant.

The consortium led by Nepal's NMB Bank, coled by Nepal Investment Bank and participated in by Prabhu Bank, Everest Bank and Nepal SBI Bank, pledged the loan to the cement company, which has been conducting trial production of cement since May 2018.

The joint venture said that the loan was sought from Nepali banks to conclude financial closure of the cement plant. It has already received approval to inject Foreign Direct Investment (FDI) worth US\$86m from Investment Board of Nepal and the central bank. The Chinese joint-venture partner has pledged to inject total FDI of US\$360m, making it the largest FDI ever in the country's cement industry.

Kyrgyzstan: Commission for new plant proposed

Member of parliament Karamat Orozova has proposed setting up a commission to examine building a new cement plant in the Batken region. She has proposed allocating land and loans for local businesses to build a new unit, according to the Central Asia News Service. The politician has criticised the decision to place the South-Kyrgyz Cement (SKC) plant in the Osh region of the country given the neighbouring problems in Batken. The 1.0Mt/yr SKC plant was built in 2010 with Italcementi.

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Vietnam: 20Mt of cement exported in just eight months

The Vietnamese cement sector exported 2.01Mt of cement in August 2018, a 44% year-on-year increase but 90,000t less than in July 2018. During the first eight months of 2018, cement exports reached 20.1Mt, exceeding the whole year target of 18-19Mt, according to the Ministry of Construction's Building Material Department (BMD).

Total production stood at 63.9Mt in the first eight months, a year-on-year increase of 30%. The domestic market consumed 43.8Mt. According to the BMD, the industry is likely to reach its consumption target of 65-66Mt in the domestic market for the whole of 2018. On top of Vietnam's current large cement capacity, the list of cement projects that are expected to come into operation after 2018 include some very large capacity projects. These include Sông Lam Cement's production lines 3 and 4 with a total capacity of 3.8Mt/ yr, Thái Nguyên Group's Hà Tiên Cement Project in Bình Phước with an annual capacity of 4.5Mt/yr and the Tân Thắng Cement Project in Nghệ An Province with an annual capacity of 1.8Mt/yr.

Australia: New international president for James Hardie

Cement fibreboard maker James Hardie has picked its president of international operations Jack Truong to succeed Louis Gries as its new President and CEO. Dr Truong, who currently heads the firm's Asia Pacific fibre cement business and the Europe building products unit, will become global president and CEO for a six-month transition period as Mr Gries winds down his 13-year spell in charge. A former chief executive of Electrolux North America, Dr Truong has held his current role since April 2017.

"Jack offers the ideal combination of commercial expertise, operational excellence, and leadership in order to continue to grow the business and maintain the industry-leading performance, across the multiple geographies established by Louis over a long period," said chairman Michael Hammes.



Japan: Earth doesn't move for Taiheiyo

Taiheiyo Cement says that an earthquake that took place in early September 2018 in Hokkaido has had a limited effect upon its business. No injuries to employees were reported. Cement production at its Kamiiso plant is continuing using in-house power generation, although the unit is working on saving energy. The 6.7 magnitude earthquake caused widespread disruption on the island, including knocking out local power generation.

South Korea: Ssangyong launches cement sector's largest WHR plant

Sangyong Cement has launched what it says is the world's largest waste heat recovery (WHR) unit at its Donghae plant in Gangwon. The 43.5MW unit had a budget of US\$889m and was originally planned to launch in 2016.

11 boilers plus turbines and cooling towers have been installed on six cement kilns at the site. The system will work in conjunction with an energy storage system that was installed in April 2017.

Bangladesh: Clinker carrier capsizes

A vessel carrying around 1500t of clinker has capsized near Bhasanchar of Noakhali in the Bay of Bengal. Mohammed Selim, deputy director of Bangladesh Inland Water Transport Authority (BIWTA), Chittagong said that all the 13 crew members of MV Sheikh Parvin were rescued.

India: UltraTech joins EP100 scheme

UltraTech Cement has announced that it is joining EP100, a global leadership initiative that brings together a growing group of 'energy-smart companies.' The company said that becoming a member reaffirms UltraTech's commitment to driving sustainability across its value chain and accelerating business growth. By becoming a member of EP100, UltraTech has committed to double its energy productivity, a critical lever it to reduce the CO₂ intensity of its operations. It will provide a strategic boost to UltraTech's low carbon growth target of reducing carbon intensity by 25% by 2021 against its 2005 baseline.

Nigeria: Analyst blames falling Lafarge Africa earnings on merger

Financial analysts Cordros Securities has blamed falling earnings at Lafarge Africa on the merger of its Nigerian businesses with Lafarge South Africa. In a research report the analysts found that the merger increased operating costs and reduced shareholder value, according to the Vanguard newspaper. Lafarge WAPCO's earnings per share, earnings before interest, taxation, depreciation and amortisation (EBITDA) and profit before tax have all fallen since 2013. It also found that operating costs had increased 'significantly' following the merger, debt had risen and that earnings had also been hit by efficiency issues.

Lafarge announced plants to merge its businesses in Nigeria and South Africa in 2014. The move saw the consolidation of Lafarge South Africa, United Cement Company of Nigeria, Ashakacem and Atlas Cement to Lafarge WAPCO. It was subsequently renamed Lafarge Africa.

Chad: CIMAF launches grinding plant

Morocco's Ciments de l'Afrique (CIMAF) has launched commercial operations at its new 0.5Mt/ yr grinding plant at Lamadji. CIMAF regional director Hatim Kahttabi said that the production capacity of the unit is expandable to 1Mt/yr. The project had an investment of Euro35m and it has created 200 jobs.



Congo: Producers wary of tax rise

Cement producers have expressed concerns about government plans to increase Value Added Tax (VAT) on cement to 18% from 5%. Cement prices are expected to rise as manufacturers pass the extra cost on to consumers, according to the Central African Information Agency. An industry source quoted by the agency said that local cement plants are doing badly due to a capacity utilisation rate of 10 - 20%. The country has five cement plants with a production capacity of 3.2Mt/yr but cement consumption was only 0.7Mt in 2017.



Contents

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Ad Index

Zimbabwe: Lafarge says cement shortage was 'temporary'

afarge Zimbabwe says that it is able to supply the market with cement following a shortage. In a statement, the subsidiary of LafargeHolcim said that the recent surge in demand was 'temporary' and that, overall, the situation was a 'positive signal of economic growth,' according to the Chronicle newspaper. It said that the situation might be attributable to a rise in mortgage finance as well as improved disposable income following a successful tobacco and maize farming season on the back of the Command Agriculture Programme.

Cement prices have reportedly risen by over 50% due to the shortage. Producers have blamed the situation on technical problems following maintenance works at their plants. They have also ruled out any further increases in prices. Despite the cement shortage they have warned against trading cement on the black market.

Egypt: Helwan agrees to sell white plant

Helwan Cement has agreed to sell its white cement plant in Minya Governorate to Emmar Industries. The transaction is planned to take place following the de-merger of the white cement unit from the rest of the company. The subsidiary of HeidelbergCement and Suez Cement said that the sale was part of its plan to restructure the business and improve its financial position.

Nigeria: Dangote launches BlocMaster

Dangote Cement has formally launched BlocMaster Cement product in Kano. The new cement product is described as 'extra strong' and targeted at block moulders. Joe Makoju, the group managing director of Dangote Cement, said the new brand had followed 'years' of research and that it had been tested and approved by builders.

Egypt: National Company for Cement closes down

The Ministry of Public Business Sector has shut down the National Company for Cement due to mounting losses. Hisham Tawfik, the Minister of Public Business, said that the plant's losses had reached Euro43m in the last year, according to Egypt Today magazine. Its creditors include the Gas Company and the Egyptian Electricity Company.

The company's registration with the local stock exchange was closed in August 2018. The government is now intending to sell its stocks in the Suez Cement Company and Al-Nahda Company. The company's assets will then be sold. The minister said that workers aged 50 years or more will receive redundancy and that younger workers will be moved to other cement companies.

The cement producer reported mounting losses in recent years due to higher production costs. Reportedly, the cost of producing one ton of cement was 60% higher than the average comparable cost of its competitors.

Gabon: New CIMAF plant to start in November 2018

Morocco's Ciments de l'Afrique (CIMAF) says it plans to start a new production line at its Cimgabon integrated plant by November 2018. The measure has been announced to meet a sudden surge in demand, according to the L'union newspaper. Cement prices have reportedly nearly doubled in the high construction season.

The cement producer first announced the new clinker production line in mid-2017. It will increase the plant's production capacity to 0.85Mt/yr from 0.5Mt/yr at present. In addition the company has launched a Euro10m project for an admixture unit for completion by mid-2019.

Nigeria: BUA looking to establish Ebonyi State plant

BUA Group has announced that it will commence core drilling in Ebonyi State, prior to establishing a greenfield cement plant there. Speaking in the state capital Abakalik on 5 September 2018, BUA's Managing Director Kabiru Rabiu said that he was surprised there was no cement plant already in the state, despite there being enormous limestone deposits. Ibeto Cement is in the process of setting up two integrated cement plants in the state.

"We are here because the state is blessed," said Rabiu. "It has a huge deposit of limestone that is very high in quality. The state also has coal, which is necessary for cement production. The state is strategically located; it is close to Enugu, close to Cross River State and close to the Middle Belt."

Namibia: Solar plant inaugurated

Ohorongo Cement officially inaugurated its 5MW photovoltaic solar plant in September 2018 at its head offices at Farm Sargber near Otavi in the Otjozondjupa Region.

Speaking at the opening, Tom Alweendo, Minister of Mines and Energy said that solar electricity generation had grown exponentially in Namibia since the inception of the Renewable Energy Feed-In Tariff programme in 2014.





In addition the company was paying its workers twice the average wage of other stateowned businesses.

Algeria: ASEC to sell Zahana plant

Egypt's Qalaa Holdings has announced that its subsidiary ASEC Cement is looking to exit from Algeria-based Zahana Cement Factory. ASEC holds around a 35% stake in the Algerian facility and has so far invested US\$62m in the plant, taking its capacity to 0.75Mt/yr. A new 1.6Mt/yr production line is currently being constructed at the plant, with commissioning expected in early 2020.

Nigeria: Dangote is most admired brand

Dangote Group is the most admired brand in Nigeria according to a survey of around 50 brands by marketing agency Brand Nigeria. Several variables such as innovation capacity, product quality, online presence, leadership and presence of products in the local market, have led Dangote to lead this ranking, according to the research team.





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Peter Edwards, Global Cement Magazine

GLOBAL CEMENT: WEST AFRICA

Cement in West Africa

This article looks at the cement sector, related statistics and recent news from 15 West African nations: Benin, Burkina Faso, The Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone and Togo.

West Africa encompasses 15 independent states, all of which were former colonies of western powers, mainly France and the UK. The majority gained independence in the 1950s and 1960s, although Liberia gained independence from the United States as early as 1847. By contrast, Guinea-Bissau did not gain independence from Portugal until 1974.

Since independence, several of the countries in the region have been politically unstable. In a number of cases, the power vacuum caused by the departure of colonial powers led to the re-emergence of competing

interests along previous political and tribal lines. The emergence of one or other party led, in several states, to oppression of the opposition and a number of dictatorships. In some cases, military coups d'état brought an end to democratically-elected governments; in others they simply replaced existing dictators.

A broad transition towards more stable, multiparty democratic systems occurred in the early 1990s. Once again, this was often precipitated by the military seizing power from dictators, or those viewed as such. Today, the vast bulk of countries in the region are identified as presidential representative democratic republics (or close approximations), whether or not this holds true on the ground. Benin, Burkina Faso, Mali, Nigeria, The Gambia, Liberia and Sierra Leone are ranked by the Economist Intelligence Unit (EIU) as 'hybrid regimes.' Such regimes incorporate the foundations of democracy, with some tendencies towards authoritarianism. Hybrid regimes may have governments that apply undue pressure to opposition groups, have nonindependent judiciaries, widespread corruption and / or limited press freedom. Togo, Niger, Ivory Coast, Mauritania and Guinea-Bissau are ranked 'Authoritarian' by the EIU. Only Ghana, Senegal and Guinea are ranked as democracies, albeit flawed ones.

In West Africa coups remain a feature, with Guinea-Bissau (2008), Mauritania (2008), Niger



(2010) and Mali (2012) seeing coups so far in the 21st Century. There have been failed coups in Benin (2013), The Gambia (2014) and Burkina Faso (2015).

Despite the political situation, economic growth in the Economic Community of West African States (ECOWAS), which includes all of the countries in this review except Mauritania, is strong. ECOWAS' GDP average growth was 4.7%/yr from 2010 to 2017.

Country	Integrated (Mt/yr)	Grinding (Mt/yr)	Total (Mt/yr)
Nigeria	58.9	-	58.9
Ghana	1.8	6.8	8.6
Senegal	8.0	-	8.0
lvory Coast	-	6.9	6.9
Burkina Faso	1.2	5.6	6.8
Togo	3.0	1.2	4.2
Mauritania	_	2.4	2.4
Benin	2.0	0.3	2.3
Mali	_	1.5	1.5
Guinea	-	1.1	1.1
Liberia	-	0.8	0.8
Niger	0.5	_	0.5
Sierra Leone	-	0.1	0.1
TOTAL	75.4	26.7	102.1

Right: Lagos, Nigeria is the largest city in West Africa with 21 million inhabitants in 2017. **Source:** Shutterstock.com.

Right - Table 1: West African countries, ranked according to installed cement capacity in 2018. Source: Research towards *Global Cement Directory 2019.*



Cement industry - By country

Nine of the 15 countries covered by this review are home to 24 active integrated cement plants that share 75.4Mt/yr of capacity. There are a further 25 grinding plants currently in operation in 10 of the countries that add a further 26.7Mt/yr of capacity. The combined regional total is 102.1Mt/yr. All countries have domestic cement production capacity, except The Gambia and Guinea-Bissau. Most countries have capacities in the range of 1-10Mt/yr. The significant outlier is Nigeria, which has more than the others combined (58.9Mt/yr to 43.2Mt/yr). This information is broken down by country in Table 1.

Cement industry - By company

There are 26 different cement producers in West Africa. The top six are shown in Table 2. Between them they share 74.3Mt/yr of the region's capacity, around 73% of the total.

GUINEA-The largest producer is Dangote Cement, a rising regional player owned by Africa's richest man, Aliko Dangote. The company has 30.0Mt/yr of capacity in Nigeria (28.5Mt/yr) and Senegal (1.5Mt/yr), as well as a 0.5Mt/yr plant that is under construction in Niger. It also has significant further capacity in the rest of Africa and has previously mooted projects further afield.

While LafargeHolcim, HeidelbergCement and Vicat have capacity in West Africa, multinational players have a fairly small proportion of regional capacity compared to most other world regions. They share 33.6Mt/yr of active capacity, around a third of the regional total. The other players in the top six are BUA Group, which, like Dangote, is based in Nigeria, and Ghana-based WACEM.

Benin

The Republic of Benin is located on the Bight of Benin between Nigeria to the east and Togo to the west. It gained independence from France

in 1960 and has had its current constitution as a representative democracy since 1990.

Benin has three integrated cement plants that share >2Mt/yr of capacity, as well as a 0.2Mt/yr grinding plant. The largest producer in the country is Cimenterie du Benin, which operates the 1.3Mt/yr Masse plant. Société des Ciments d'Onigbolo, 50% owned by LafargeHolcim, is the second-largest. It operates a 0.7Mt/yr integrated plant in Cotonou. HeidelbergCement subsidiary Cimbenin also operates a 0.3Mt/yr plant in Cotonou based on ball mill

Rank	Company	Capacity (Mt/yr)	Headquarters
1	Dangote Cement	30.0	Nigeria
2	LafargeHolcim	22.2	Switzerland
3	HeidelbergCement	7.4	Germany
4	WACEM	6.7	Ghana
5 =	BUA Group	4.0	Nigeria
5 =	Vicat	4.0	France

MAURITANIA

GUINEA

LIBERIA

MAURITANIA

GUINEA

LIBERIA

SENEGAL

SIERRA LEONE

IVORY

COAST

BENIN

NIGER

NIGERIA

BENIN TOGO

TOGO

MALI

BURKINA

FASO

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COAST

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GAMRIA

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GAMRIA

GUINEA-

BISSAU

BISSAU

SIERRA LEONE

Left - Table 2: Top five cement producers in West Africa. ranked according to installed cement capacity in 2018. Source: Research towards Global Cement Directory 2019.

Global Cement

0Mt/yr







Left - Figure 3: GDP/capita (US\$) of West African countries. Source: World Bank Data Indicators.







Right: Intercem Engineering inaugurated a train unloding station in Ouagadougou for Cimfaso in August 2017. Source: Intercem Engineering. technology from Fives FCB. Reda Cimenterie also operates an integrated cement plant in Cotonou.

Burkina Faso

Landlocked Burkina Faso is located to the north of Ivory Coast, Ghana, Togo and Benin. Known as Upper Volta until 1984, the country



has been independent from France since 1960. In September 2015 the country saw a coup d'état by the Regiment of Presidential Security. However, the coup was reversed when its leader publicly apologised and vowed to restore the civilian government. Power was restored to the pre-existing President and Prime Minister after three weeks and fresh elections were held in November of the same year.

Burkina Faso has 1.2Mt/yr of integrated cement capacity from CIMFASO's plant in the capital Ouagadougou. The plant is ultimately owned by Cim Metal Group. The company also operates a 2.1Mt/yr grinding plant in Ouagadougou, plus another 2.0Mt/yr plant at Bobo-Dioulasso.

HeidelbergCement operates the 0.8Mt/yr Cimburkina grinding plant at Kossodo. Cimburkina started upgrade work to the plant in February 2018. The US\$2.85m project will centre on the installation of a new mill. This will more than double its production capacity to 2.0Mt/yr. Other works will include a new 2000t limestone silo and a new bagging unit. The new mill is scheduled to start production in December 2018.

Burkina Faso's cement sector is set to grow even further in the coming months, with the construction of CIMAF's grinding plant in Bobo-Dioulasso, which began in mid 2016. Construction of the plant drew complaints from local residents and business in July 2018. They had complained that dust from the plant might damage their crops. The plant was originally scheduled to be in production by the end of 2017.

The Gambia

The Republic of The Gambia is mainland Africa's smallest nation, constituting a narrow strip of land to the north



and south of the River Gambie. Other than a short Atlantic coast to the west, it is entirely encircled by neighbouring Senegal.

The Gambia gained independence from the UK in 1965 but has endured instability for significant periods. Long-standing President Dawda Jawara was ousted by Yaha Jammeh in a coup in 1994. Jammeh placed a ban on political opponents until 2001,



although Jammeh continued to pressurise political opponents and the media until he himself was ousted in 2017. The country now has a new President in the form of Adama Barrow.

The Gambia has no cement production capacity within its borders. There is a single locally-based importer, Gacem, which has been part of Italcementi (now HeidelbergCement) since 1993. It imports cement via barge to its Kanifing, Greater Banjul factory, from where it is distributed in bulk and in bags.

Since 2017, LafargeHolcim Algeria has also been importing cement into The Gambia. It exported barges of approximately 30,000t each in December 2017, March 2018 and April 2018.

Salam Company is in the process of building a 0.25Mt/yr cement grinding plant in Banjul. The plant, which has a ball mill (\emptyset = 3m, L = 9.5m, Motor = 1250kW)is currently being constructed by Austria's CEMTEC and will be operational in 2019.

Ghana

The Republic of Ghana is located between Togo to the east and Ivory Coast to the west, with Burkina Faso to the



north. Ghana gained independence from the UK in 1957 and subsequently saw five coups between 1966 and 1981. However, in line with the trend towards greater democracy in the 1990s, the country's first multi-party elections were held in 1992. They have since been held reliably every four years, with little disruption and no further military intervention. Today Ghana is one of the safest and most politically-stable countries in Africa.

Ghana has the second-largest cement sector among these 15 countries after Nigeria. It is home to 8.6Mt/yr of capacity from six grinding plants (5.8Mt/yr) and one integrated plants (1.8Mt/yr). The largest producer in Ghana is WACEM (4.2Mt/ yr), which also controls subsidiaries elsewhere in West Africa. In Ghana WACEM operates a 1.8Mt/ yr integrated cement plant at Buipe and three grinding plants at Volta (0.8Mt/yr), Takoradi



(0.6Mt/yr) and Bokro (1.0Mt/yr). HeidelbergCement is the other main player in the Ghanaian cement market via its Ghacem subsidiary. It has 3.4Mt/yr of cement grinding capacity at Tema (2.2Mt/yr) and Takoradi (1.2Mt/yr). The third and final player as far as production capacity is concerned is Morocco-based CIMAF, which operates a 1.0Mt/yr grinding plant at Tema. Nigeria's Dangote Cement also has an import terminal in Tema.

Ghana's seven cement plants will soon be joined by two others. In August 2017 CBI Ghana began construction of a US\$55m cement grinding plant at Tema. At the time it was publicised that the plant would take 12 months to build. Alongside this, Ghana and Iran are jointly building a 0.6Mt/yr cement plant at the Dawa Industrial Enclave, also near Tema. The plant, in which the Iranian government has a 90% stake, is scheduled for completion in late 2019.

In January 2018, Ghacem opened a 3000t cement terminal at Sefwi Dwenase in the Sefwi-Wiawso Municipality. The unit is the cement producer's sixth terminal in the country.

Guinea

The Republic of Guinea is south of Senegal, south west of Mali, north of Sierra Leone and Liberia, west of Ivory Coast and east of



Guinea-Bissau. It gained independence from France in 1958.

From 1984 to 2008 Guinea was ruled by Lansana Conté, who gained power in a military coup. The 1990s saw a moderate shift to greater civilian control, although multi-party elections held in 1993, from which Conté retained power, were marred by

 Below: CEMTEC is in the process
 Cor

 of building Guinea-Bissau's first
 199

 ever cement grinding plant, due
 trol

 for completion later in 2018.
 trol

 Source: CEMTEC.
 from



accusations of government tampering. Conté died in 2008, prompting a coup within six hours. Elections were held in 2010 but the political environment remains difficult.

Guinea has no integrated cement plants but has two grinding plants. The slightly larger is the 0.6Mt/yr Conakry plant run by Ciments de Guineé, a 59.9% LafargeHolcim subsidiary. A 0.5Mt/yr plant was established by Morocco's CIMAF in Dubréka in 2012.

Guinea-Bissau

The Republic of Guinea-Bissau is the second-smallest country in this review after



The Gambia. It is sandwiched between Senegal and Guinea. Having gained independence from Portugal in 1974, Guinea-Bissau endured a dictatorship for 20 years until its first multi-party elections in 1994. However, the military has sought to intervene over the years, including rogue soldiers assassinating the President João Vieira in 2009 and a coup in the capital in 2012.

Guinea-Bissau has no cement capacity of its own but this is set to change in 2018. CEMTEC is in the process of supplying a mill ($\emptyset = 3m$, L = 9.5m, Motor = 1250kW) for a 0.3Mt/yr grinding plant for CIMAF in Bissau. Plans for a grinding plant were also announced by Maxime Cardoz amd HeidelbergCement subsidiary Scancem in January 2015. The companies applied for US\$25m of International Finance Corporation (IFC) funding but have since failed to report on the progress of the grinding plant, if any.

Ivory Coast

The Republic Côte d'Ivoire is a former French colony



that borders Liberia, Guinea, Mali, Burkina Faso, Ghana and the Gulf of Guinea. It gained independence in 1960. Initially the country was something of a West African powerhouse becoming a major exporter of cocoa, palm oil and pineapples, albeit under a single-party political system. This lasted until a coup in 1999, with elections subsequently held in 2000 against a violent backdrop. Since then two civil wars and continued economic instability have stifled development.

Ivory Coast has four cement grinding plants that share a combined capacity of 6.9Mt/yr. The largest producer is Cim Ivoire, which operates a 2.9Mt/yr grind-

GLOBAL CEMENT

ing plant in Abidjan. Also in Abidjan is LafargeHolcim, Ivory Coast's second-largest cement producer. It expanded its grinding plant in Abidjan from 0.9Mt/yr to 2.0Mt/ yr in February 2018 at a cost of US\$28.5m. CIMAF operates a 1.0Mt/yr cement plant, again in Abidjan, as well as a 1.0Mt/yr mill in San Pedro from Austria's CEMTEC. CEMTEC is currently in the process of adding a second 0.5Mt/yr line identical to the first. CIMAF is also in the process of constructing a 0.3Mt/yr mill in Bouake.

Also under construction is a 1.0Mt/yr plant by the Turkish Limak Group, once again in Abidjan. Commissioning is expected in the fourth quarter of 2018. Elsewhere, in March 2018, the West African Development Bank (Board) approved a loan for a cement plant project by Cim Ivoire to build a new 3.0Mt/yr plant, in Abidjan once more.

Liberia

The Republic of Liberia, literally meaning 'land of freedom,' is a notable exception to the familiar story of European colonialism within West Africa. The country



gained independence from the United States in 1847 having been a refuge for former Afro-American slaves since 1822. The country was one of the most stable in Africa until 1980, when President Samuel Doe overthrew the government and adopted increasingly divisive policies. Political corruption, disputed elections and coups resulted in two civil wars (1989-1997 and 1999-2003). A transitional government was installed by the UN in 2003 and, since 2005, the country has once again held elections. The most recent was held in 2017.

Liberia has one cement grinding plant, which is located in the capital Monrovia. It is operated by Cemenco, an 81.67% HeidelbergCement subsidiary. The 0.8Mt/yr plant has been in operation since 1968. It produces Portland cement in 50kg bags and distributes them via a network of 30 distributors.

In December 2017 the Liberian government reviewed a US\$41m investment proposal by Nigeria's Dangote Cement that proposes the construction of a a 0.3Mt/yr cement grinding plant in Monrovia. The government is also attempting to get Liberia Steel and Cement Mining (LIMCEMCO) to build an integrated cement plant by way of a tax break. The status of both projects is unknown.

On 18 August 2018 Cemenco reduced the price of its cement from US\$8.50/bag to US\$6.85.bag, a 19.4% reduction. On 22 August 2018 the Chairman of the Cement Distributors Association (ACEMDAL), Varmah G Moore, said that Cemenco should reconsider the move, which was the result of discussions between the company and the Ministry of Commerce. He said that, while distributors did not object to the decision in principle as part of the government's 'pro-poor' policy, ACEMDAL had not been included in the decision-making process and the price may not be appropriate for the market.



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Mali

The land-locked Republic of Mali was formerly part of French West Africa and gained independence in 1960. It saw a bloodless coup



in 1968, which led to the 23 year regime of President Moussa Traoré. In the 1970s and 1980s Traoré became increasingly authoritarian and dissenters were repressed during three failed coups. A fourth coup was successful in 1991. Relative stability followed for 20 years, but another coup in 2012 saw a return to conflict when seperatists demanded greater autonomy for northern Mali. The new government was forced from the region, which then rapidly fell to armed Islamic groups. France was called to help fight the Islamists in 2013 and the conflict only officially ended in April 2015.

Mali has two active cement grinding plants. Astro Cement's 1.0Mt/yr plant at Kati is the larger of the two. The other is CIMAF Mali's 0.5Mt/yr plant at Diago Koro, which was inaugurated in December 2016. Also in December 2016 the government agreed that Gaia Equity could build a 1.5Mt/yr integrated cement plant at Guinbané in collaboration with Chinese cement plant manufacturer Sinoma. The Invest in Mali website states that the plant will be active during the first half of 2019.

Mauritania

The Islamic Republic of Mauritania is a large nation in the west of the Sahara Desert. It gained independence from France in 1960. Until 1978 it was ruled by President Moktar Ould Daddah, who was



ousted in a bloodless coup. A succession of military leaders ruled until elections in 1992, although these were not contested by the majority of opposition parties. A coup in August 2005 was followed by elections but then a further coup in 2008. Since 5 August 2009 the President has been Mohamed Ould Abdel Aziz. The next Presidential elections will be held in August 2019.

Mauritania has no integrated cement plants but has four grinding plants that share 2.4Mt/yr of capacity. Ciments de Mauritanie operates a 1.0Mt/yr grinding facility in Nouakchott. HeidelbergCement operates a 0.4Mt/yr grinding plant via its subsidiary MAFCI, also in Nouakchott. Vicat, via its 65% subsidiary BSA Ciment operates a 0.5Mt/yr plant, once again in Nouakchott. Nouakchott is also home to CIMAF's 0.5Mt/yr CEMTEC-built plant, which came online in 2017.



Niger

The Republic of the Niger is a landlocked country named after the river of the same name. It is bordered by



the similarly named Nigeria to the south, (as well as Benin), with Burkina Faso and Mali to the west, Algeria and Libya to the north and Chad to the east. It gained independence from France in 1960 and has since seen a series of coups in 1974, 1996, 1999 and 2010. It continues to fight Islamic groups with the help of foreign forces in the north of its territory.

Niger has one integrated cement plant, which is located in the south west of the country close to the Beninese border. It is a 0.5Mt/yr wet process facility operated by Société Nigeriénne de Cimenterie that has been in operation since 1964.

Dangote Cement is in the process of building a 1.5Mt/yr dry process integrated plant at Keita. Nouvelle Cimenterie de Niger (NCN) also plans to build a US\$90m plant in Malbaza. Work at the unit was started in mid-2011 but was abandoned for several years.

Dangote Cement imports cement into Niger from Nigeria. In March 2018 the first imports from Algeria were also received from the Aoulef cement plant in Afrar Province, albeit at an initially small quantity of just 950t.

Right: Street market scene in Niamey, the Nigerien capital. **Source:** Shutterstock.com

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Nigeria

The Federal Republic of Nigeria has the largest population in West Africa, with 186 million inhabitants in 2016.



A former British colony, it gained independence in 1960, enjoying six years until a double coup in 1966. In 1967 - 1970 a civil war was fought after the country's Eastern Province declared independence from Nigeria as the Republic of Biafra. After the war ended, Nigeria gained significant new income from oil sales under a series of military leaders until 1999, when the country entered a new, more democratic era. Elections in 1999, 2003 and 2007 were criticised for not being free and fair. The election of Goodluck Jonathan in 2011 was a far fairer affair, as was the election of Muhammadu Buhari in 2015.

Cement sector

Nigeria has by far the largest cement industry in West Africa, with 12 integrated cement plants that have a total of 58.9Mt/yr of cement capacity. Another two integrated cement plants are under construction, which will add a further 7.5Mt/yr of capacity when completed. A grinding plant is also under construction.

Dangote dominates

Nigeria-based Dangote Cement is the largest cement producer in Nigeria, as well as in the rest of West Africa. It has three integrated plants in its home country, which share a combined 28.5Mt/yr of cement capacity. This is enough to give it a very dominant position in the local market, with 48% of national capacity. It is part of Dangote Group, a US\$3bn turnover company involved in cement, flour production, sugar refining, energy, packaging construction, port management, petrochemicals and more.

Dangote Group acquired the Benue Cement Company from the Federal Government in 2000, and followed up with the acquisition of Obajana Cement Plc from the Kogi State Government in 2002, although the company had not completed its proposed cement plant since its founding 10 years earlier. Construction of the Obajana plant began in 2004. It was commissioned in 2007 with an initial capacity of 5Mt/yr. Obajana Cement Company changed its name to Dangote Cement in July 2010 and merged with Benue Cement in September of the same year. Dangote Cement was listed on the Nigerian Stock Exchange in October 2010.

After consolidating its pan-African interests into Dangote Cement in May 2011, the company entered a phase of rapid expansion. It opened its 6Mt/yr Ibese plant in February 2012 and completed a 5Mt/yr expansion to the Obajana plant (increasing it to 10Mt/yr) in June 2012. The Ibese plant was expanded to 12Mt/yr in November 2014. In the same month Obajana was taken to 12.5Mt/yr.

Since 2015 Dangote Cement has focused on pan-African expansion. It now has cement facilities in Ghana, South Africa, Cameroon, Ethiopia, Zambia, Tanzania, Sierra Leone and Republic of the Congo.

In 2017 Dangote Cement's sales revenue rose against a backdrop of lower cement sales volumes. Its revenue rose by 31% year-on-year to US\$2.23bn in 2017 from US\$1.70bn in 2016. However, sales volumes of cement in Nigeria itself fell by 15.9% to 12.7Mt from 15.1Mt.

"Although Nigerian volumes were lower in 2017, our Pan-African operations increased volumes by 8.4% and now make up 42% of the Group's total cement sales, demonstrating the robust diversification of our business," said Joe Makoju, Group CEO of Dangote Cement.

Regionally, Dangote said that its estimate for the total Nigerian cement market fell by 18% to 18.6Mt in 2017 due to a recession in the first half of the year and higher prices. It also noted that its Gboko plant in Benue State was mothballed for 'most of the year'.

However, a recovery in the local economy drove improved performance in the first half of 2018, when Dangote's sales revenue grew by 16.9% year-on-year



Right: Constitution Avenue in Abuja, the Nigerian capital. **Source:** Red Confidential / Shutterstock.com.

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Dangote could benefit from re-aligned UK priorities post-Brexit

Dangote Cement appointed former Xstrata CEO Mick Davis as a nonexecutive director alongside Cherie Blair, a lawyer and the wife of ex-UK Prime Minister Tony Blair, in late April 2018. The board appointments are targeted at strengthening the company's board.

The reason for such high-level appointments did not become fully clear until late August 2018, when British Prime Minister Theresa May met with Aliko Dangote in Lagos as part of her pan-African trade tour. During the meeting, Dangote reiterated his intention to list the company on the London Stock Exchange (LSE), following the meeting.

During the visit May said, "Already the finance and business links between Lagos and London are bringing enormous benefits to businesses and people in the UK and in Nigeria. London is a world-leading financial centre and, as the UK leaves the European Union, it will play an even greater role in financing the fastest-growing economies across Africa and the world."

May was in the country as part of a multistop trade tour of African nations ahead of the UK's departure from the European Union on 29 March 2019.



Above: Aliko Dangote, President of Dangote Cement. Source: Dangote Group website.



Above: UK Prime Minister Theresa May. Source: Drop of Light / Shutterstock.com.

to US\$1.34bn from US\$1.15bn. Revenue in Nigeria rose by 18.1% to US\$959m and in the rest of Africa revenue rose by 11.4% to US\$386m.

"Our first-half performance was very strong and driven by an excellent recovery in Nigeria, where our sales volumes increased by nearly 14% and revenues rose by more than 18%," said Makoju. Earlier Makoju revealed that the company exported 0.21Mt of cement to Ghana, Togo and Niger from Nigeria in the first quarter of 2018.

Dangote Cement opened a terminal at Owerri in Imo State in July 2018. The unit was officially inaugurated by the governor of the state, Chief Rochas Okorocha, with Dangote Group President Aliko Dangote also in attendance. In a speech at the event, Dangote said that the state was one of the 'major' domestic markets for the company.

Other cement producers in Nigeria

The second-largest cement producer in Nigeria by installed capacity is LafargeHolcim, which holds stakes in Ashaka Cement (42.63%), Lafarge Africa (72.74%) and UNICEM (50%). Via these three it has a stake in cement plants with a total capacity of 18.9Mt/yr. Taking into account the various percentage stakes that LafargeHolcim has in each of these, we can calculate that LafargeHolcim benefits from around 10.0Mt/yr of this capacity.

Lafarge Africa, which has cement plants in Nigeria and South Africa, saw its sales rise by 36% year-on-year to US\$835m in 2017 from US\$613m

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Left: Map of Nigerian States, colour coded by integrated cement capacity. Source: Research conducted towards *Global Cement Directory 2019*.



Benue Cement (Dangote), Ikoyi, Lagos State, 4.0Mt/yr.
 Dangote Cement, Obajana, Kogi State, 12.5Mt/yr.
 Dangote Cement, Ibese, Ogun State, 12.0Mt/yr.

4. Lafarge Africa (72.74% LafargeHolcim), Ewekoro, Ogun State, 1.1Mt/yr (Expanding to 2.7Mt/yr).

Lafarge Africa (72.74% LafargeHolcim), Sagamu, Ogun State, 0.9Mt/yr.
 Lafarge Africa (72.74% LafargeHolcim, Ewekoro, Ogun State, 2.5Mt/yr.

Calange Ainta (72.74%) calangeholdini, Ewekolo, Ogun State, 2.5M(7).
 UNICEM (50% LafargeHolcim), Calabar, Cross River State, 7.5Mt/yr.

8. Ashaka (42.63% LafargeHolcim), Gombe, Gombe State, 3.0Mt/yr.

9. Ashaka (42.63% LafargeHolcim), Ashaka, Gombe State, 3.9Mt/yr.

Edo Cement (BUA), Auchi, Edo State, 0.5Mt/yr.
 Edo Cement (BUA), Okpella, Edo State, 3.5Mt/yr.
 Sokoto Cement (CCNN < BUA Group), Kalambania, Sokoto State, 2.0Mt/yr.
 Cement Company of Northern Nigeria (BUA), Sagamu, Ogun State, 5.5Mt/yr.

Ibeto Cement, Enegu, Ebonyi State, 2.2Mt/yr (Under construction).
 Ibeto Cement, Effium, Ebonyi State 5.0Mt/yr (Under construction).
 Cross River State Cement Plant 1, Government, Announced 2017.



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in 2016. Its recurring earnings before interest, taxation, depreciation and amortisation (EBITDA) nearly doubled to US\$161m from US\$81m. CEO Michel Puchercos attributed the strong margins in its Nigerian business to cost initiatives and higher prices. He added that the company's increased use of alternative fuels and coal to offset gas shortages in the west of Nigeria and a focus on coal and gas in the east and north of the country aided market share.

In March 2018 LafargeHolcim held a signing ceremony with Chinese cement plant manufacturer CBMI for a 5000t/day cement plant upgrade project at its Ewekoro plant in Ogun State. This will enlarge the plant from 1.1Mt/yr at present to 2.7Mt/yr once work is completed. Meanwhile Ashaka Cement plans to complete its 16MW captive power plant in early 2019. The subsidiary of Lafarge Africa and LafargeHolcim started the US\$30.5m project in 2017. Once operational the power plant will supply power to the national grid as well as the cement plant.

The third-largest cement producer is BUA Group, which has 11.5Mt/yr of integrated cement capacity through Edo Cement (4.0Mt/yr) and Cement Company of Northern Nigeria (CCNN), which has 5.5Mt/yr of capacity at Sagamu, Ogun State, plus 2.0Mt/yr of production capacity via its Sokoto Cement subsidiary in Kalambania. BUA announced in late June 2018 that it would merge CCNN with Sokoto Cement, the plant of which has only recently been commissioned.

New plants

Ibeto Cement is in the process of building two integrated cement plants in Nigeria, at Enugu (2.2Mt/ yr) and Effium (5.0Mt/yr), both in Ebonyi State. It has hired China's Sinoma to build the plants. Ibeto secured US\$850m of funding for the projects from Milost Global in May 2018. In addition, the Cross River Ministry of Solid Minerals Development announced that it was seeking investors to build a cement plant at Akamkpa in July 2017.

Senegal

The Republic of Senegal is located in the far west of Africa, surrounded by Mauritania to the



north and north east, Mali to the east and Guinea and Guinea-Bissau to the south. The country has an unusual U-shape, as it surrounds The Gambia on three sides.

Senegal is unusual within Africa in that it has experienced neither a coup d'état nor harsh authoritarian leadership. Since it gained independence from France in 1960, Senegal has been led by a series of democratically-elected Presidents, with elections held every five years. The incumbent is Macky Sall, who was elected in 2012 and 2017. Not everything has been plain sailing for Senegal, however. A protracted conflict took place between the government and separatists in the southern Casamance region (below The Gambia) between 1980 and 2004. Lowlevel disruption has continued once again in the region since 2006, although not with the previous level of intensity.

Senegal has the third-largest cement sector among these 15 countries, after Nigeria and Ghana. It has 8.0Mt/yr of capacity across three integrated

First Dangote order for Gebr. Pfeiffer

Germany's Gebr. Pfeiffer struck a deal to sell a MVR 6000 R-4 mill for raw material grinding and a MPS 3350 BK mill for processing coal for kiln firing for Dangote Cement's new plant at Okpella in Edo State in April 2018. The mill order is the first for Gebr. Pfeiffer from the Nigerian cement producer. The order was placed by China's Sinoma International Engineering.

The MVR mill featuring a total drive power of 4000kW will grind 550t/hr of cement raw material to a fineness of 10% R 90 μ m. The MPS 3350 BK with a drive power of 1100kW is designed for a throughput rate of 50 - 70t/hr and will grind Nigerian coal, imported coal and/or petcoke, to a fineness of 12% R 90 μ m. Gebr. Pfeiffer's own staff will supervise erection and commissioning.

Two Dangote mills for Loesche

Dangote Cement will use two vertical roller mills (VRM) from Germany's Loesche for a new production line at its Obajana plant. The contract partner for the project is China's Sinoma International Engineering, which has previously installed seven clinker and cement raw meal VRMs for the Obajana plant. The order comprises a six-roller mill for raw cement meal with a capacity of 580t/hr, the largest roller mill for raw material in the Loesche range, and a three-roller mill with a modular design featuring a drive power range of 1000kW for grinding hard coal and lignite with a throughput of up to 70t/hr.

The scope of delivery also includes an LDC classifier for the raw cement mill and an LSKS ZD classifier for the coal mill.

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Right: Entrance to the 3.5Mt/yr SOCOCIM cement plant in Senegal. Source: Vicat website.

Right: View of Libcem's grinding plant in Sierra Leone. Source: HeidelbergCement website.



plants. There are no grinding plants in the country. The largest producer by installed capacity is Vicat, which operates a 3.5Mt/yr plant via its SO-COCIM Industries subsidiary, which was established in 1948 as Société de Chaux et du Ciment. It was renamed as Société Commerciale du Ciment (SOCOCIM) Industries in 1978. It became part of Vicat in 1999. The current plant was constructed in 2008-2009 via a U\$268m investment.

Ciments du Sahel operates a 3.0Mt/ yr plant in the capital Dakar. It currently has two lines, with a third under construction that will take capacity to 5.9Mt/yr when it is commissioned. Dangote Cement operates a 1.5Mt/ yr plant in Port Thiés. The Dangote

plant was established in December 2014. This is also undergoing an expansion of 1.5Mt/yr.

All of these expansions will give rise to a national capacity of 12.4Mt/yr in the coming years. However, cement production was just 1.8Mt in the first half of 2018, a 5.6% rise compared to the same period of 2017. Local sales of cement grew by 50.6% to 1.28Mt from 0.85Mt. However, exports fell by 37% to 0.56Mt from 0.90Mt. It's somewhat hard to imagine that all of the cement capacity will be required.

Sierra Leone

The Republic of Sierra Leone is bordered by Guinea to the north and east, Liberia to the south east and the Atlantic Ocean to the south west.



A former British colony, it gained independence in 1961. Initial self-rule brought wealth under Sir Milton Margai, although the country slid gradually into authoritarian one-party rule under Milton's half brother Sir Albert Margai before three back-to-back coups in 1967 and 1968. A one-party state was in force for much of the 1970s and 1980s and a brutal civil war was fought between 1991 and 2001. A return to civilian rule came in 2003 and some progress has since been made. The current President is Ernest Bai Koroma, who was elected in fair and free elections in 2007.

Sierra Leone has the smallest cement sector of the 13 countries here that have any cement capacity. HeidelbergCement operates a 0.1Mt/yr Fives FCB ball mill (\emptyset = 2.4m, L = 10m) at Cline Town, Freetown via its Sierra Leone Cement Corp (Leocem) plant. The plant site dates back to 1994. Dangote Cement has operated a 0.5Mt/yr bagging terminal in Sierra Leone since January 2017.



Togo

The Togolese Republic is located on the Gulf of Guinea (to the south) and is sandwiched be-

tween Benin to the east and Ghana to the west. It has a shorter northern border with Burkina Faso. A French colony unil 1960, Togo has been severely affected by military rule, coups and political infighting over the years. A period of relative stability has been observed in the years since 'largely' free and fair elections in 2007.

Togo has 4.2Mt/yr of cement capacity split across two integrated plants (3.0Mt/yr) and two grinding plants (1.2Mt/yr). The Togolese cement market is equally split in capacity terms between HeidelbergCement via its Scantogo subsidiary, and WACEM, via West African Cement and Fortia Cement. Each operates a separate 1.5Mt/yr integrated plant at Tabligbo. Each also operates a 0.6Mt/yr grinding plant: HeidelbergCement's is at Lomé and WACEM's is at Tabligbo.

Scancem, which became part of HeidelbergCement in 1999, has been involved in the Togolese market since the mid 1960s. The integrated plant was established by HeidelbergCement in March 2015.



Here Global Cement Magazine presents its monthly review of global cement prices, in US\$ for easy comparison. Additional price information is only available to subscribers to Global Cement Magazine. Subscribe on Page 64. In this issue subscribers receive information from seven more countries, including Kazakhstan, Liberia, Honduras, Zimbabwe, China and India.

Prices are for metric tonnes (Mt), unless stated otherwise. US\$ conversions from local currencies are correct at the time of original publication.

Philippines: The Department of Trade and Industry (DTI) is monitoring cement prices in Cebu, following the temporary suspension of quarrying activities in the province and select other regions of the country after a fatal landslide in Naga, Cebu. It is possible that cement supplies will come under pressure, leading to price rises, if the stoppages become prolonged.

Germany: Christian Knell, the president of the German Cement Works Association (VDZ), has warned that meeting climate change goals was leading to 'considerable' costs for the cement industry. It is possible that this will result in an increase in sales prices for cement in Germany and elsewhere in the EU. Knell said that 'suitable boundary conditions would have to be created' for climate change issues and noted that on-going trends in European emissions trading and the 'rapidly' increasing price of CO_2 were leading to mounting costs. Knell made the comments during the opening ceremony of the 8th *International VDZ Congress 2018* in Düsseldorf, Germany on 26 September 2018.



Bolivia: The economic slowdown in Bolivia is driving local cement firms into a pricing war. The cost of a 50kg bag of cement has fallen to US\$6.67/bag, from US\$10.85/ bag.

> Itacamba has been particularly aggressive with its sales, which has pushed prices down. It multiplied its own cement supply by five after opening a new factory

in Yacuses in February 2017. Itacamba's cement is selling in Santa Cruz for US\$6.37-6.51/bag. Fancesa's cement sells for US\$6.51-6.66/bag.

Egypt: Ordinary Portland Cement prices as of 27 September 2018: Arabian Cement (Al Mosalah) = US\$47.66/t; Arabian Cement (Al Nasr) = US\$46.55/t; Cemex = (Almuhandis) = US\$50.62/t; Building Materials Industries Company = US\$46.27/t; Elnahda Cement (Al Sakhrah) = US\$46.27/t; Lafarge (Al Makhsous) = US\$47.66/t; Medcom Aswan Cement = US\$46.55/t; Arish Cement (Alaskary) = US\$47.66/t; Arish Cement (Askary Beni Suef) = US\$47.66/t; Sinai Cement = US\$46.86/t; Suez Cement = US\$47.03/t; Tourah Portland Cement = US\$47.59/t; Helwan Cement = US\$47.59/t; Misr Beni Suef = US\$48.15/t; El Sewedy Cement = US\$47.87/t; South Valley Cement = US\$46.58/t; Misr Cement Qena = US\$46.47/t.

White cement prices as of 27 September 2018: Sinai White Cement (Alabid Elada) = US\$100.40/t; Sinai White Cement (Super Sinai) = US\$97.61/t; El Menya Cement - Super Royal = US\$97.61/t; Menya Helwan Cement = US\$98.72/t.

Blended cement prices as of 27 September 2018: Sinai Cement (Alnakheel) = US\$43.23/t; Helwan Cement (Alnakheel) = US\$43.23/t.

Sulphate-resistant cement prices as of 27 September 2018: Cemex (Almukawem) = US\$50.76/t; Lafarge (Kaher Albehar) = US\$50.20/t; Suez Cement (Al Suez Sea Water) = US\$48.80/t; El Sewedy Cement = US\$49.64/t.

Libya: According to our correspondent: Helwan Cement Company (HeidelbergCement, Egypt) is selling at US\$3.07/bag (50kg). Libyan cement from Aletehad Cement in western Libya is US\$3.72/bag.

Do you have your finger on the cement price pulse where you are? If so, *Global Cement Magazine* needs you!

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How artificial intelligence will change the building industry.

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Contents

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Ad Index



There are already many forms of artificial intelligence (AI) in the world today. Weak or narrow AI is a kind of machine-based expertise that is focused on a single or very narrow range of tasks. This is already very widely available. Siri and Alexa might be thought of as weak AI, although they are already sophisticated compared to achievements only a decade ago¹: they combine speech recognition and natural language processing to 'understand' what you are asking them. They then have a set of capabilities that they can act upon (such as making a call, setting an alarm or ordering flowers for Mother's Day on the internet, but not something in the real world such as making a cup of tea).

The current level of even the most sophisticated AI in the cement industry would be regarded as weak or narrow, since it can do a small range of jobs very well. These include the following:

• Fine-tuning pyroprocessing systems to optimise fuel mix, flame attributes, air-flow, feed rates, damper settings etc, in order to achieve a better outcome than even the best operator;

• Listening-to and understanding the spectrum of vibrations from a mill or fan and diagnosing any problems, long before a human could do so;

• Optimising delivery truck logistics and planning in real-time using GPS and neural networks, beyond the capabilities of any human handler.

These narrow AIs use a combination of approaches to solve their tasks, including algorithms, neural networks, fuzzy logic and machine learning (where optimised outcomes are iteratively achieved without explicit training, using statistics²).

Computers have also mastered some other skills, such as chess, Go and Jeopardy (in the last case, the computer, IBM's Watson, first has to work out what the question means, then works out some possible answers based on the information it has to hand - 200 million pages of text - then work out which answers are most likely to be correct and then give the best answer - all faster than the very best players of all time ³). It turns out that the game-playing ability of Watson can be used to provide services for almost any information-heavy industry, including healthcare, banking, insurance, and telecoms. The original machine that won Jeopardy was as big as a master bedroom, but is now the size of a microwave oven. It's also 240% faster and capable of answering simultaneous questions from multiple users. Adding image processing and the ability to understand other 'dark data' such as graphs and photos will further enhance Watson's abilities. However, there are plenty of other Watson-like AI alternatives out there on the market already, available as a service on a rental plan. AI is already out there - who knew?

However, all this weak or narrow so-called AI is just a warm-up for the real thing. Strong or general AI is understood to be expertise over a wide range of tasks, at least as good as a typical human. This does not currently exist, since it would be prohibitively expensive to endow a machine with all the myriad abilities that you have yourself (driving, drawing, chatting, thinking, feeling - and so much more). However, I can see a case for the construction of such an AI, in a robotic body for piloting a craft to and then exploring Mars. Without doubt this AI robot should be named 'Robert.'

Incidentally, a third form of AI is postulated - that of superintelligence - when AI far exceeds the capabilities of even the brightest of human minds - possibly coming after a putative moment of 'singularity.' Let's see.

So, how will the various evolving forms of AI affect the construction industry? Peter Debney⁴ makes the following suggestions:

• AI will be used to create 3D maps, blueprints and construction plans, incorporating extensive automated Building Information Modelling (BIM);

• AI will be used to take over the administrative and project management roles;

• AI will be used to advise on how specific construction projects should be planned (for example the design and construction methods to build a bridge);

• AI will be used to make buildings more efficient in use, for example by automatically reducing a building's energy consumption to the lowest possible level.

I can certainly see a time when cement plants and their logistics operations are almost entirely AI-controlled, possibly from some remote location. The cement trucks may be driverless, delivered to an AI-augmented construction site, to build AI-designed houses, buildings and bridges. Truly, the future is AI.

1 https://magoosh.com/data-science/siri-work-science-behindsiri/

2 https://en.wikipedia.org/wiki/Machine_learning

3 https://www.techrepublic.com/article/ibm-watson-the-insidestory-of-how-the-jeopardy-winning-supercomputer-was-born-andwhat-it-wants-to-do-next/

4 https://www.artificialintelligence-news.com/2018/03/16/howartificial-intelligence-is-changing-the-construction-industry/

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